

*Forest & Hydrant*  
G. N. HOUSTON ✓  
DEPARTMENT OF THE INTERIOR

FORESTRY BRANCH.

REPORT OF THE PROCEEDINGS

OF THE

FOURTH ANNUAL CONVENTION

OF THE

WESTERN CANADA IRRIGATION ASSOCIATION

HELD AT

KAMLOOPS, B.C., AUGUST 3, 4 AND 5, 1910

by authority of Hon. Frank Oliver, Minister of the Interior.

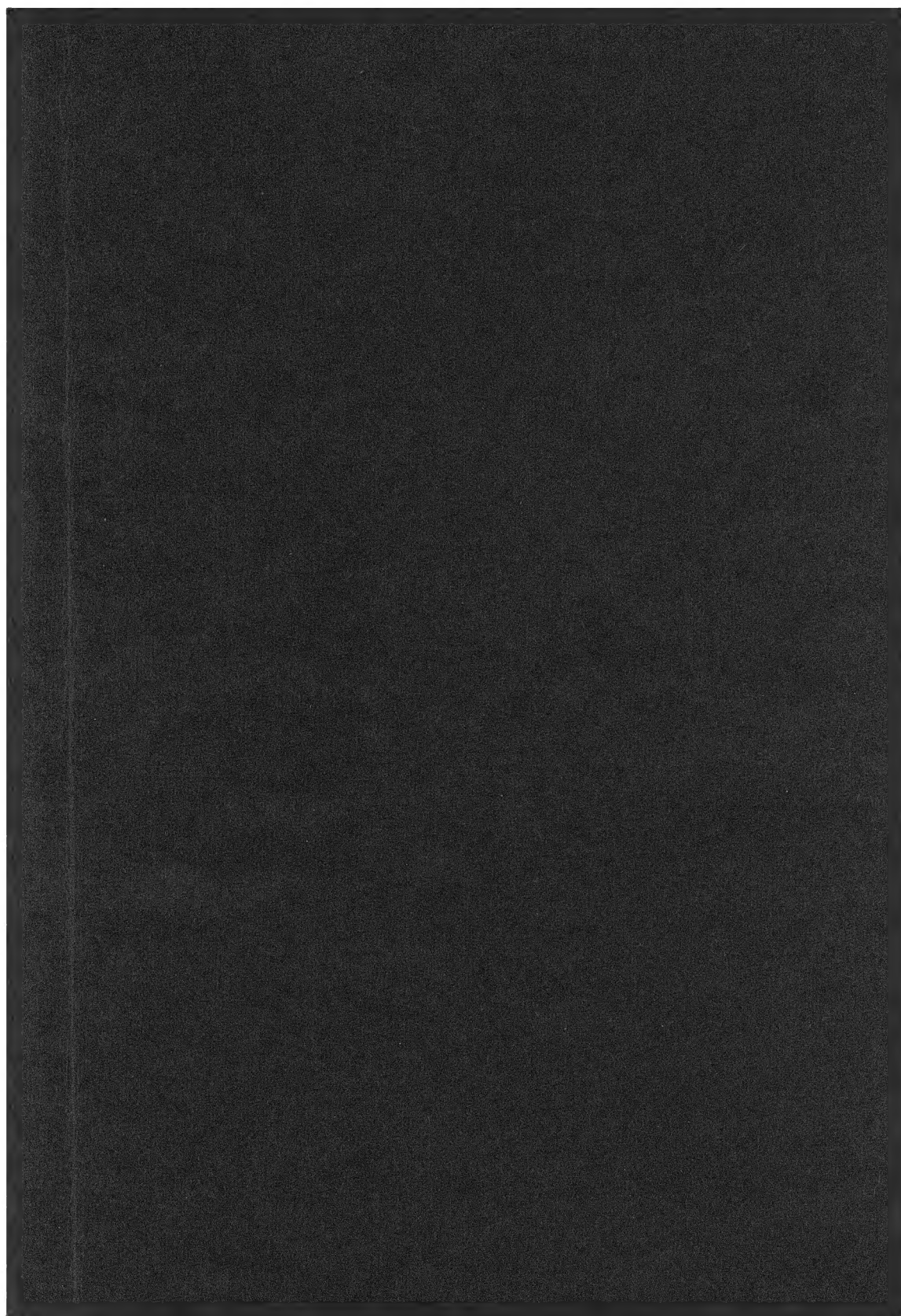
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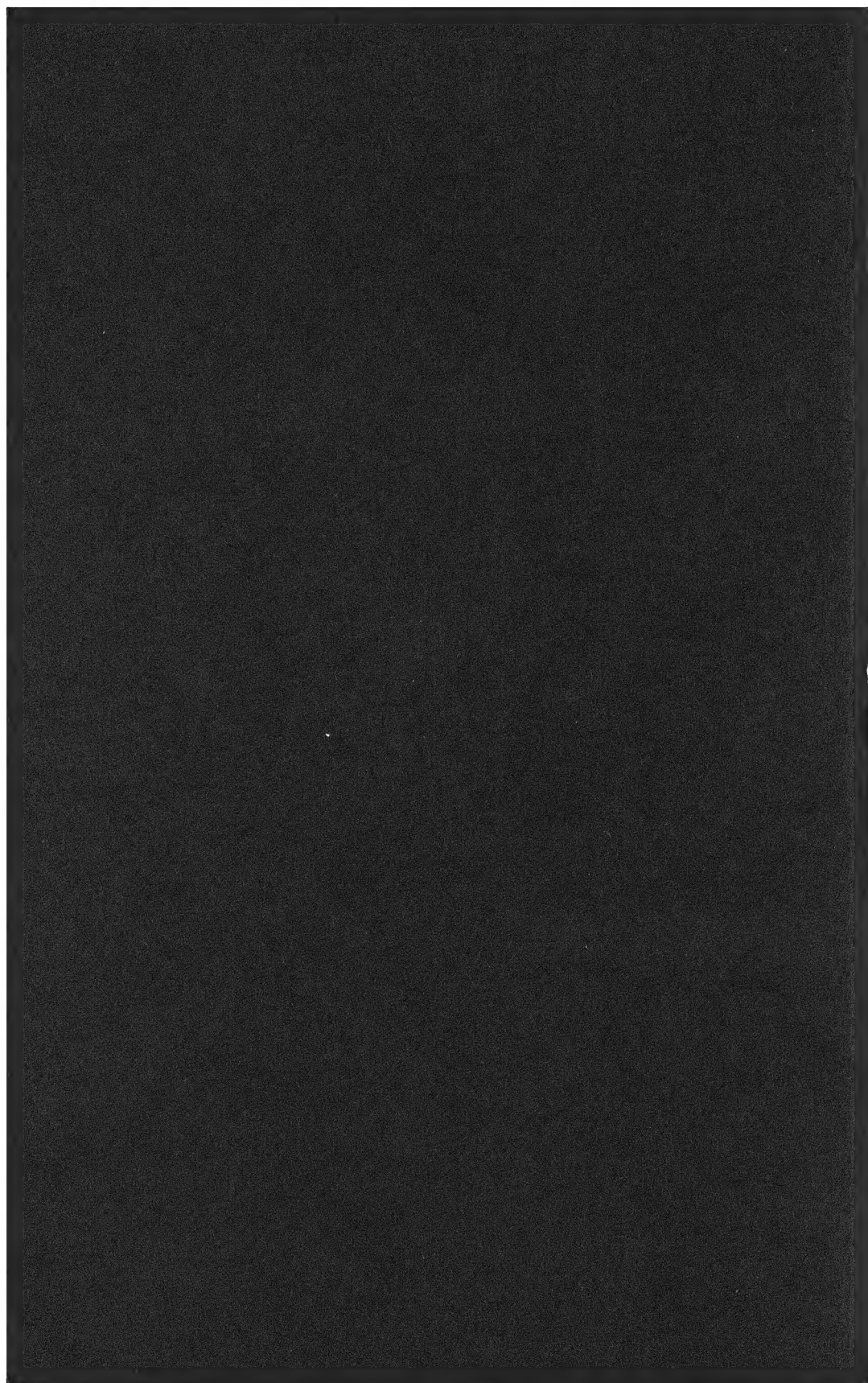
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## **WESTERN CANADA IRRIGATION ASSOCIATION.**

### **OFFICERS FOR 1910-11.**

Hon. President—His Honour Lieut. Governor of Alberta.

President—WILLIAM PEARCE, Calgary.

First Vice-President—F. J. FULTON, K.C., Kamloops.

Second Vice-President—R. R. JAMIESON, Calgary.

### **EXECUTIVE.**

C. W. PETERSON, Calgary.

W. H. FAIRFIELD, Lethbridge.

HORACE GREELEY, Maple Creek.

Dr. CHAS. W. DICKSON, Kelowna.

C. A. MAGRATH, M.P., Lethbridge.

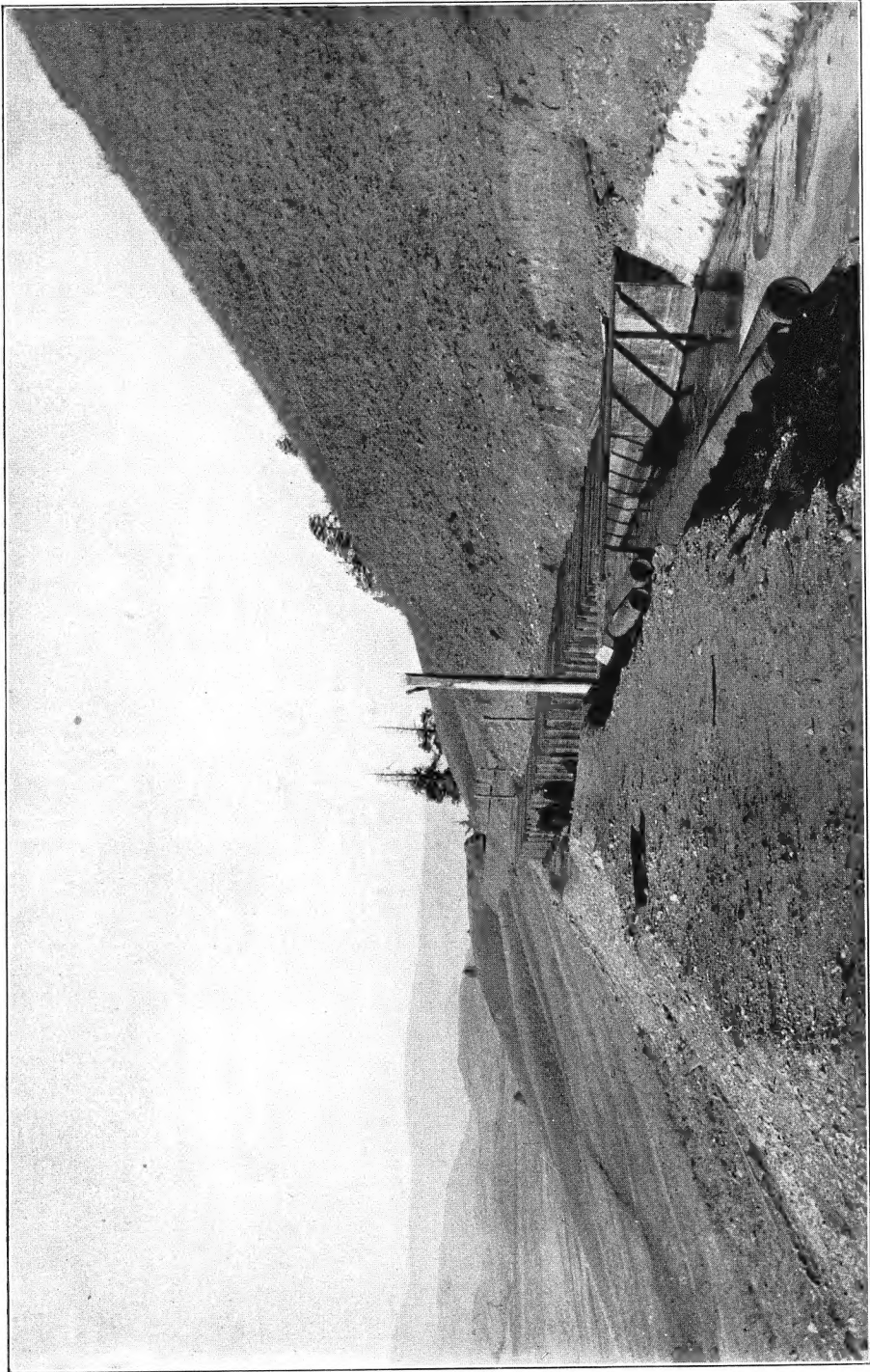
R. H. AGUR, Summerland.

R. H. PALMER, Kamloops.

*Permanent Secretary*:—JOHN T. HALL, Brandon.

*Treasurer*:—C. W. ROWLEY, Bank of Commerce, Calgary.

*Next Place of Meeting*:—Calgary, Alta.



White Valley Irrigation and Power Co., Ltd., Vernon, B.C. View of canal on Coldstream estate, eight miles from Headgates.



## FOREWORD.

In preparation for the convention official notices were sent out as follows:—

OFFICE OF THE SECRETARY,

BRANDON, MAN.

‘The Western Canada Irrigation Association hereby extends to you a cordial invitation to be present at the Fourth Annual Convention, to be held in the City of Kamloops, B.C., August 3, 4 and 5, 1910.

‘The Conventions of this Association have now become a recognized factor in the progressive development of irrigation in Western Canada, and this, the fourth annual convention, promises to be the mark of a still further step along lines of advancement in the art and science of irrigation.

‘Arrangements are being made to have the recognized experts in Irrigation and allied subjects address the Convention, and every opportunity will be given for the interchange of ideas and discussions thereon that will lead to their very best development.

‘A large number of delegates are already promised and it is hoped that every person interested in practical irrigation will be present.

‘The basis of representation at the convention as established by the constitution is as follows:—

‘The Governor General of Canada, Members of the Dominion Cabinet, the Senate and the House of Commons, the Dominion Commissioner of Irrigation, Superintendent of Forestry, the Director and Superintendent of Dominion Experimental Farms, five representatives of the Canadian Society of Engineers, two representatives from each Canadian railway and one from each agricultural paper in Canada.

‘From the Provinces of Manitoba, Saskatchewan, Alberta and British Columbia:—

‘The Lieutenant Governors, the members of the Legislatures, the Deputy Ministers of Provincial departments, Provincial irrigation commissioners, three each for all Irrigation and Irrigation Colonization companies, two each for all Agricultural, Forestry and Live Stock associations, five each for all cities, appointed by the Mayor, two each for Boards of Trade or similar organizations, two each for all town, village or rural municipalities to be appointed by the mayor, reeve or overseer, two each for all Canadian Clubs to be appointed by the president, the superintendent or representative appointed by him, for each experimental or demonstration farm, three representatives from other Irrigation Associations to be appointed by their presidents.

‘It is especially requested that any one having a resolution to bring before the convention for discussion, mail a copy of the same to the executive committee secretary at Brandon, by July 20th, so that it may be printed for convenience at the Convention.

'And also that intending delegates will notify Thos. Calloway, Kamloops, B.C., local secretary, of their intention to be present in order that the necessary accommodation may be arranged.

'The usual convention rates will be obtained from the C. P. R., the A. R. & I., C. N. R. and also G. N. R.

'Be particular to observe the following:—A list of your delegates should be sent in as early as possible, and urge upon them the necessity of buying a single fare ticket, and at the same time, procuring a standard certificate from the agent that you are a delegate to this convention. If they come over more than one line of railway, get a standard certificate from each railway company when purchasing the single fare ticket.

'Register and hand in your certificate to the secretary immediately on your arrival in Kamloops, and see that you get it back from him before leaving, in order to get your reduced fare home.

'We sincerely trust that you will impress upon your people the great importance of this convention, particularly at the present time when Western Canada is entering upon an era of prosperity greater than she has ever enjoyed before, and with the country settling up so rapidly that towns seem to spring up in a night. It is of vital importance that the representative business men of the west should get together and discuss the problems of the day and the possibilities of the future for the provinces along the line of irrigation.

(Signed) JOHN T. HALL, *Secretary,*

*Western Canada Irrigation Association.*



## REPORT OF PROCEEDINGS OF CONVENTION.

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### OPENING SESSION.—WEDNESDAY MORNING.

The fourth annual convention of the Western Canada Irrigation Association opened in Kamloops on Wednesday, August 3, 1910, at 10 a.m.

The chair was taken by Mr. F. J. Fulton, K.C., President of the Association, who immediately declared the convention open for business. The following committees were then appointed.

*Credentials*.—Messrs. W. H. Fairfield, of Lethbridge; W. J. Tregillis, of Calgary; Thomas Calloway, of Kamloops.

*Resolutions*.—Messrs. A. E. Ashcroft, of Vernon; Dr. Dixon, of Kelowna; J. T. Hall, of Brandon; V. D. Currie, of Campbell Creek; W. Pearce, of Calgary; W. H. Fairfield, of Lethbridge.

Mr. FULTON.—‘I will name Mr. Ashcroft as convenor of the Resolutions Committee.’

Moved by R. M. Palmer and seconded by A. E. Howse: ‘That the Credential Committee be instructed to accredit all those present who have an actual and bona fide interest in irrigation.’ Motion was carried unanimously.

Moved by W. J. Tregillis and seconded by P. Smith: ‘That R. B. Bennett, K.C., of Calgary, be elected permanent chairman of the convention.’ Motion carried unanimously.

Moved R. M. Palmer and seconded by Thomas Calloway: ‘That Mr. F. J. Fulton, owing to the non-arrival of Mr. Bennett, act as chairman in the meantime.’ Motion carried unanimously.

### PRESIDENT’S ADDRESS.

Mr. F. J. FULTON, President of the Association, then addressed the convention as follows:—

‘I do not propose to keep the meeting with any lengthy address. We are already somewhat late in starting and I propose to get down to business as quickly as possible.

‘I wish to say that I am very pleased indeed to see so many delegates present to-day at the opening session of the convention. I have been present myself at every meeting of the Association since its inception four years ago and I am very glad indeed to see that we have as many representatives present as I have seen at any meeting we have had. I am very glad to see that the interest in this Association is

being kept up and I hope it will continue. I am informed there are a number not here yet. A number from the Northwest will be in on the noon train. I hope to see a good representation from all the provinces, pointing to the extent of the interest in this Association. I am also glad to see that we have present with us to-day the premier of this province, showing the great interest he takes in a matter of this kind and I am looking forward to his address this afternoon with great pleasure. I propose to proceed with the order as laid down in the programme and I therefore call on Mayor Robinson to address the delegates. He will welcome the delegates on behalf of the city.'

#### MAYOR J. T. ROBINSON.

'Mr. President and Gentlemen of the Western Canada Irrigation Association: My remarks to you this morning will be very brief, because if I attempted at the present moment to make any lengthy speech I might get it mixed up with some of the speech I made a very few minutes ago in connection with the Canadian Northern railway and I would not like to get two such important matters as the Canadian Northern and the Western Canada Irrigation Association mixed up, and I am therefore going to be very brief.

'The first thing I wish to say on behalf of the city of Kamloops is that I am delighted to see so many delegates here at this meeting. I had the pleasure of attending this convention three years ago at Calgary and I was struck then with the importance of this matter. I am very glad to see so many representatives from every section of the country and I trust that now that they have had the opportunity of seeing our city many will be so pleased and taken with the city that they will take up their homes here and remain with us. I am glad to see the number of men of importance we have with us. We have the premier of the province, we have here representatives from the two provinces to the east of us, men of standing in those provinces, which shows the great interest being taken in irrigation matters, and the feeling of the three western provinces; and on behalf of the city of Kamloops I extend to you all a very hearty welcome. We are pleased, and more than pleased, to have you with us to-day and I only wish that you who come from the outside will be as pleased with Kamloops as we are to have you with us. We want you to take a trip around the city, and in the words of the premier this morning, "I can assure you that there is a great future in store for this city." We are destined to become a most important place. Everything points that way. We have the railway, we have the irrigation system, we have the fruit lands, we have the push; you are here to testify to-day that we have the temperature, and we have everything that ought to make us a great city. There is no doubt about it and I trust you will take this opportunity of looking around you, and sizing everything up and if you do I hope, as I said before, that a great number of you will remain and make your homes with us.'

#### SECRETARY'S REPORT.

Mr. J. T. Hall then submitted his annual report as follows:—

'In compliance with resolution No. 1, passed at the last convention of the association held in the city of Lethbridge, August 5 and 6, 1909, and which practically

created an office of permanent secretary and to which position I was appointed by your executive on September 13, 1909, one of the first duties to be attended to was to ask the federal and provincial governments for financial assistance, in order that we might conduct a more vigorous and progressive campaign in educating the people as to the benefits to be derived from scientific and systematic irrigation. With this object in view we addressed the following letter to Hon. Frank Oliver, Minister of the Interior. Said letter and reply require no comment from us, they speak for themselves:—

‘HON. FRANK OLIVER,

‘Dec 8th. 1909.

‘Minister of the Interior,  
Ottawa.

‘DEAR SIR,—Acting under the instructions of the officers and the executive committee of the Western Canada Irrigation Association, I have been requested to write to you and ask if it could not be possible for your department to make a grant to assist the Association in spreading abroad a better knowledge of the principle of irrigation and of the benefits derived therefrom.

‘Hitherto your department has been very generous to us in printing, free of charge, the reports of our annual conventions and for this, as an association, we feel very much indebted to you.

‘The only revenue which we have is derived from small grants made by the provincial governments and as the work we are carrying on is educational in its nature we feel that it should be worthy of consideration.

‘I beg to remain,

‘Yours respectfully,

(Signed) ‘JOHN T. HALL,

‘Secretary.’

‘OTTAWA, January 6, 1910.

‘JOHN T. HALL, Esq.,

‘Medicine Hat, Alberta.

‘DEAR SIR,—Yours of December 8 to hand asking for a grant to assist the Association in publicity.

‘In reply I beg to say that we have hitherto printed at our expense the reports of your annual convention and will be very glad to continue to do this, but I do not think that a grant to the Association would be in its best interests.

‘The great value of such an Association as yours is in the living interest which its members take in its work and proceedings.

‘Unless their interest is a living interest it is of minimum value, and when the proceedings of the Association are carried on slowly at the expense of its members that is a guarantee of their living interest in the Association’s work.

‘I am satisfied that a grant towards the general expenses of the Association would detract from its value in the important work that it performs.

‘Yours very truly,

(Signed) ‘FRANK OLIVER.’

'We also wrote to Hon. A. C. Rutherford, premier of Alberta, Hon. Walter Scott, premier of Saskatchewan and to Hon. Price Ellison, Chief Commissioner of Lands, B.C., as follows:—

DECEMBER 16, 1909.

'DEAR SIR,—In the year 1907, a number of individuals interested in the propagation of a wider knowledge regarding the principles of irrigation throughout the western provinces, met in the city of Calgary and organized the Western Canada Irrigation Association and for three years this Association has been engaged upon an educational campaign in endeavouring to impress upon the people the necessity of the proper conservation of water and its economic distribution upon the land.

'This is realized as a great necessity in the development and cultivation of the land, more particularly in the southern portions of Saskatchewan and Alberta and in the fruit growing districts of British Columbia.

'In all three provinces there are hundreds of irrigation schemes, as shown by the map issued during the present year by the Department of the Interior.

'The first convention of this Association was held in Calgary, July 17, and 18, 1907.

The 1908 convention was held in Vernon, August 10 and 11; the 1909 convention in Lethbridge August 5 and 6.

'The Department of Interior has recognized the importance of this work by publishing the proceedings of these conventions as a governmental report and assuming all the cost thereof.

'As the Association has no direct source of revenue and as its work is for the general good, I have been requested by the officers and the executive committee of the Association to write and ask you if it would not be possible for your government to grant some financial assistance to this Association.

'For the 1908 convention the government of British Columbia made a substantial grant and for the 1909 convention the government of Alberta made a grant.

'It is the desire of the executive to enlarge the scope and work of the Association and this cannot be done if we do not receive some financial recognition from the governments of the three provinces directly interested.

'The next convention will be held in Kamloops, B.C., and we will esteem it a great favour if you will kindly give our application for assistance your careful consideration at an early date.

'I am, yours very truly,

(Signed) 'JOHN T. HALL,

*Secretary.'*

Hon. Mr. Rutherford replied as follows:—

'EDMONTON, Dec. 18, 1909.

'DEAR SIR,—I received your letter of the 16th inst. in which you state that it is the desire of the executive of your Association to enlarge the scope of work of the Association.



'Will you kindly let me know what enlargement of the work is contemplated, so that my government may be in a position to decide whether or not we shall give an appropriation for the work.

'Yours faithfully,

(Signed) 'A. C. RUTHERFORD,

*'Premier of Alberta.'*

To which we replied as follows:—

'Dec. 21, 1909.

'Hon. A. C. RUTHERFORD,

'Premier of Alberta,

'Edmonton, Alberta.

'DEAR SIR,—I beg to acknowledge the receipt of your favour under date of December 18, contents fully noted. In reply I beg to state that immediately after the last convention of the Western Canada Irrigation Association held at Lethbridge, the executive held a consultation by correspondence and outlined the plan of permanent organization and conferred an honour on me by appointing me permanent secretary for their organization.

'Their idea is that we should establish a bureau for information and collect data of the various irrigation systems in the United States and in other foreign countries which would at all times be available to those engaged in irrigation problems in Western Canada whether they were operating on a large or small scale.

If you will kindly consult the irrigation map recently issued by the Forestry and Irrigation Branch of the Department of the Interior, Ottawa, you will note that there are hundreds of small irrigation propositions throughout South Saskatchewan, South Alberta and the province of British Columbia, and as you are also aware, South Alberta has three large propositions in the C. P. R., A. R. & I., and the Southern Alberta Land Company's irrigation schemes. It is the intention to get in touch with all parties engaged in this work and to place at their disposal all the information collected at the central office upon the subject of irrigation from various parts of the world. At present, we have nearly all the reports and bulletins issued by the United States government, which is at present spending millions of dollars in reclaiming waste, barren and arid lands and placing them under cultivation by scientific and practical systems of irrigation and the Association desires to place the results of these experiments in the hands of all interested in irrigation throughout the western provinces.

'Perhaps the subject cannot be more tritely put than it is in a quotation from the irrigation laws of Canada, by J. S. Dennis, (who has given many years to the study of the subject) which is appended hereto.\* We shall be pleased to forward reports to

---

\*The Irrigation Laws of Canada: In Canada the necessity for legislation regarding the important subject of the use of water for irrigation has become apparent only during the past few years, and may, in fact, be said to date from the time, within the past decade, when the earlier settlers in the south and southwestern portions of the Northwest Territories had, by painful experience, proved that farming without the aid of irrigation, was a precarious undertaking.—J. S. Dennis.

you from time to time as to the progress of the work and the accumulation of data that would prove of practical interest to those engaged in the work of irrigation.

‘I beg to remain, yours very truly,

(Signed) ‘JOHN T. HALL,  
‘Secretary.’

‘December 20, 1909.

‘J. T. HALL, Esq.,

‘Secy. Western Canada Irrig. Assn.,  
‘Medicine Hat, Alta.

‘DEAR MR. HALL,—I beg to acknowledge receipt of your letter of December 16, in which you request a grant of financial assistance to the Western Canada Irrigation Association on the part of the Saskatchewan government towards the expenses of the next annual convention of the Association and for the purpose of enabling an enlargement of its scope and work.

‘I regret to have to state that it is to be feared your request has been received too late for action. Our assembly was prorogued on Saturday last, having adopted the estimates for the financial year ending February 28, 1911, and it is very doubtful whether any of the items of the estimates possess sufficient elasticity to permit the making of the grant suggested. I shall, however, place the request before the provincial treasurer.

‘Believe me, very sincerely yours,

(Signed) ‘WALTER SCOTT.’

‘Dec 29, 1909.

‘Hon. WALTER SCOTT,

‘Premier of Saskatchewan,  
‘Regina, Sask.

‘DEAR SIR,—I beg to acknowledge the receipt of your favour under date of December 20, contents of which we note. We regret very much that our application did not reach you until after the House had prorogued. The assistance that we asked from the various provincial governments will be utilized not so much for the conventions as for the purpose of placing the Association upon a more permanent basis and the formation of a bureau for information to be available at all times, free of charge to all interested in irrigation problems throughout Western Canada, a large number of which are situated in Southern Saskatchewan.

‘Trusting you will give the matter due consideration and wishing you the compliments of the season.

‘I beg to remain,

‘Yours respectfully,

(Signed) ‘JOHN T. HALL,  
‘Secretary.’

VICTORIA, B.C., Dec. 23, 1909.

'W. CRAWLEY RICARDO, Esq.,

'Manager of the Coldstream Ranch,  
Vernon, B.C.

'SIR,—In the absence of Hon. Chief Commissioner I beg to acknowledge receipt of your letter of the 20th inst.; in reference to the claims of the Western Canada Irrigation Association for a provincial grant in aid of the next convention at Kamloops, and will take an early opportunity of placing same before him upon his return after the holidays.

'I understand that he has already taken the matter up with the Finance Minister.

'I have the honour to be, sir,

'Your obedient servant,

(Signed) 'R. F. CHILD.'

'VICTORIA, B. C., Dec. 20, 1909.

'DEAR SIR,—I beg to acknowledge the receipt of your letter of the 16th inst. in reference to the next sitting of the Western Canada Irrigation convention at Kamloops.

'I have already made a recommendation for the sum of \$2,000 to be placed in the estimates in the aid of the Association's next convention which I hope will go through all right.

'I quite recognize that the importance of the educational work the Western Canada Irrigation Association is spreading, and only hope that it has many successful conventions ahead.

'Yours truly,

(Signed) 'PRICE ELLISON,

'Chief Commissioner of Lands.'

It is quite evident from the above that if the Association is to receive the consideration it deserves at the hands of the various governments stronger pressure must be brought to bear than can be accomplished through the medium of correspondence, and it is with pleasure we note that the provincial government of British Columbia at least appreciates the value of the wider spread knowledge of irrigation, and much more could be accomplished if the other governments, provincial and federal would all fall in line and follow their example.

On November 10 we received the following letter from our president:—

VICTORIA, B.C., Nov. 10, 1909.

'JOHN T. HALL, Esq.,

'Secretary, Western Canada Irrigation Association,  
'Medicine Hat, Alta.

'DEAR SIR,—You may have heard of my resignation from the provincial government here, and it has just occurred to me that as my election as president of the Association was chiefly in my official capacity as Chief Commissioner of Lands of

this province, it would be only proper for me to formally resign the presidency. If the members of the executive agree with this I will on hearing from you send in a formal resignation.

‘Yours truly,  
(Signed) ‘FRED. J. FULTON.’

After consulting the executive we replied as follows:—

‘Dec. 6, 1909.

‘FRED’ J. FULTON, Esq., K.C.,  
‘Pres. W. Can. Irri. Assn.,  
‘Kamloops, B.C.

‘DEAR SIR,—Regarding the subject of your favour of November 10 we have communicated with all the members of the executive and have received replies from the following: W. H. Fairfield, W. C. Ricardo, C. Hallamore, J. T. Robinson, R. B. Bennett, E. B. Knight, and Second Vice-President Grace saw me personally. They all strongly disapprove of the course suggested in your letter and believe that it will have a disastrous effect upon the Association, and as many of them pointed out the very fact of you leaving the government will have a tendency to remove any suspicion of political bias which otherwise might have existed.

‘At the suggestion of a number of the members of the executive, we are writing to the Minister of the Interior, Ottawa, to see if some further financial assistance cannot be granted by that department in addition to the printing of the annual report which they always have been good enough to do for us since the inception of the Association.

‘I think it would be well if your local committee were to meet and name the dates of the next convention for the month of August, 1910. The last convention as you are aware was held August 5 and 6. The 1908 convention was held August 10 and 11. The first irrigation convention in Calgary was held July 17 and 18, but it was the general consensus of opinion, that it was too early.

‘Trusting to hear from you at an early date,

I beg to remain,  
‘Yours respectfully,  
(Signed) ‘JOHN T. HALL,  
‘Secretary.’

On May 16 we received the resignation of our treasurer in the following letter:—

‘KAMLOOPS, B.C.,  
‘May 16, 1910.

‘DEAR SIR,—As I am leaving this province shortly for St. John, N.B., I wish to tender my resignation as treasurer of your Association.

‘Wishing you and the Association every success in your work.

‘Yours truly,  
(Signed) ‘C. W. HALLAMORE.’

To which we replied as follows:—

May 21, 1910.

‘RE RESIGNATION RECEIVED.

‘DEAR SIR,—I beg to acknowledge the receipt of your favour under date of the 16th inst., and regret very much to learn that you are leaving the province and the West, and that you will have to sever your connection with our Association.

‘We will communicate your resignation to the executive at an early date; and on their behalf, I desire to express the thanks of the Association for the kindly interest that you have always displayed in the work of the Association since your election to office at the last convention held in Lethbridge.

‘Wishing you every success in your new field of labour, I beg to remain, sir,

‘Yours very sincerely,

(Signed) ‘JOHN T. HALL,

*Secretary.*

The following was received from Mr. W. H. Fairfield:—

LETHBRIDGE, Dec. 2, 1909.

‘DEAR MR. HALL,—I beg to acknowledge receipt of yours of the 29th. The Association has a balance of a little over a hundred dollars.

‘As I had Mr. Nichol take the funds in hand, I would prefer not to draw the entire balance out, until his return, so I am closing a cheque for \$75 which I trust will satisfy your needs at the present time and as soon as he returns I will arrange to have a financial statement made out and will send you the balance of cash on hand.

‘Your sincerely,

(Signed) W. H. FAIRFIELD,

‘Superintendent.’

This is all the funds we have had at our disposal, to carry on the work of the Association and it has practically been exhausted for printing and travelling expenses. We have had a great deal of correspondence regarding the various irrigation schemes throughout Western Canada, which would be altogether too voluminous for publication in a departmental report, but can be examined at any time by members of the Association by applying to the secretary.

‘We are embodying the foregoing letters in the form of a report for the purpose of creating a discussion as to the best methods of carrying on a more active campaign in promoting a greater interest and knowledge upon the subject of irrigation in the various provinces of Western Canada.

All of which is respectfully submitted.

JOHN T. HALL,

*Secretary, W.C.I.A.*

The report was upon motion received.

Moved by T. Calloway and seconded by J. L.C Brown ‘that the meeting adjourn until 2 p.m., Carried.



Headgates.



White Valley Irrigation and Power Co., Ltd., Vernon, B.C. Diversion Weir and Headgates.

**WEDNESDAY AFTERNOON SESSION.**

The afternoon session opened at 2 p.m.

The CHAIRMAN.—Before proceeding with the business, I have been asked if these meetings are open to the public, and I wish to say that, as long as there is room for the delegates, these meetings are open to the public and visitors are heartily welcome at the convention. I would now ask for the report of the Credential committee.

Mr. T. CALLOWAY, as convenor of the Credential committee, read the list of the following delegates as being present:—

**LIST OF DELEGATES**

W. E. Adams, Kelowna, B.C.  
 R. H. Agur, Summerland, B.C.  
 A. E. Ashcroft, Vernon, B.C.  
 W. J. Baker, Kelowna, B.C.  
 C. E. Barnes, Wabachin, B.C.  
 R. N. A. Barton, Vernon, B.C.  
 R. Baynton, Kamloops, B.C.  
 H. T. Bennett, Calgary, Alta.  
 E. E. Billinghamurst, Victoria, B.C.  
 Hon. Hewitt Bostock, Monte Creek, B.C.  
 F. W. Boulton, Vancouver, B.C.  
 D. D. Bourton, New Westminster, B.C.  
 J. L. Brown, Kamloops, B.C.  
 Robt. Brown, Summerland, B.C.  
 R. Randolph Bruce, Wilmer, B.C.  
 A. G. Bryant, Vancouver, B.C.  
 Thos. Bulman, Kamloops, B.C.  
 B. L. Burchell, Kamloops, B.C.  
 W. Burrell, Grand Forks, B. C.  
 H. M. Burwell, Vancouver, B.C.  
 Peter Byron, Burnaby, B.C.  
 Thos. Calloway, Kamloops, B.C.  
 Donald Cameron, Vancouver, B.C.  
 H. W. E. Cameron, Kelowna, B.C.  
 H. W. E. Canavan, Kelowna, B.C.  
 J. T. Carpenter, Victoria, B.C.  
 E. M. Carruthers, Kelowna, B.C.  
 J. B. Challies, Ottawa, Ont.  
 J. T. Child, Calgary, Alta.  
 C. C. Clark, Kamloops, B.C.  
 T. Cockburn, Vancouver, B.C.

John Colwell, Winnipeg, Man.  
Henry Cornwall, Kamloops, B.C.  
Thos. Cunningham, Victoria, B.C.  
V. D. Curry, Campbell Creek.  
E. A. Dagg, Calgary, Alta.  
A. W. Dalglish, Kelowna, B.C.  
A. S. Dawson, Calgary, Alta.  
Chas. W. Dickson, Kelowna, B.C.  
E. F. Drake, Ottawa, Ont.  
W. S. Drewry, Victoria, B.C.  
John Dudgeon, London, England.  
W. W. Dutcher, Vancouver, B.C.  
B. A. Etcheverry, Berkeley, Cal., U.S.  
W. H. Fairfield, Lethbridge, Alta.  
W. B. Fison, Summerland, B.C.  
W. Fortune, Kamloops, B.C.  
Fred. J. Fulton, Kamloops, B.C.  
H. H. S. George, Kamloops, B.C.  
L. S. S. George, Colbrooke, B.C.  
John W. S. George, Colbrooke, B.C.  
W. B. Gilbert, Vancouver, B.C.  
J. Gillespie, Naramata, B.C.  
C. E. Gordon, Vancouver, B.C.  
L. D. Gordon.  
A. G. Gravis, Calgary, Alta.  
H. J. Haffner, Vancouver, B.C.  
John T. Hall, Brandon, Man.  
Geo. Harcourt, Edmonton, Alta.  
W. Hargraves, Kamloops, B.C.  
J. M. Harpur, Kamloops, B.C.  
Chas. Harvey, Kelowna, B.C.  
A. Mc. L. Hawks, Vernon, B.C.  
E. Henderson, Coldstream, Vernon, B.C.  
M. Heneson, Kelowna, B.C.  
Jas. Hislop, Seymour Arm, B.C.  
A. B. Hogg, Kamloops, B.C.  
A. E. Howse, Nicola, B.C.  
Ben. Hoy, Vernon, B.C.  
W. S. Jacobs, Calgary, Alta.  
R. R. Jamieson, Calgary, Alta.  
W. E. G. Johnson, Vancouver, B.C.  
F. A. Kelly.  
Jas. C. Kennedy, Vancouver, B.C.  
John H. Kilmer, Sunnyside, B.C.  
J. G. Knight, Vernon, B.C.  
E. B. Knight, Vernon, B.C.

W. A. Lang, Peachland, B.C.  
F. H. Latimer, Penticton, B.C.  
C. E. Laurence, Kamloops, B.C.  
V. Laursen, Vancouver, B.C.  
R. F. Laurence, Kamloops, B.C.  
Father La Jeune, Kamloops, B.C.  
J. Longbourne, North River.  
A. C. Longbourne, Kamloops, B.C.  
Hon. Richard McBride, Victoria, B.C.  
A. V. McCarthy, New Westminster, B.C.  
D. McDonald, Kamloops, B.C.  
R. J. McDougall, Vancouver, B.C.  
J. A. McKelvie, Vernon, B.C.  
N. McNeil, Vancouver, B.C.  
S. Maddison, Vancouver, B.C.  
J. B. Maher, North Yabsuma, B.C.  
Hon. Duncan Marshall, Edmonton, Alta.  
J. A. Marty, Kelowna, B.C.  
A. E. Meighen, Fruitlands, B.C.  
M. S. Middleton, Nelson, B.C.  
A. K. Mitchell, Ashcroft, B.C.  
J. R. Mitchell, Kamloops, B.C.  
A. R. Muirhead, Kelowna, B.C.  
R. M. Palmer, Fruitlands, B.C.  
H. G. Parson, Golden, B.C.  
L. W. Patten, Spillumachee, B.C.  
A. Patterson, Kelowna, B.C.  
William Pearce, Calgary, Alta.  
E. T. W. Pearse, Kamloops, B.C.  
H. S. Placer, Dog Creek, B.C.  
W. R. Pooley, Kelowna, B.C.  
John Redman, Kamloops, B.C.  
J. O. Robinson, Peachland, B.C.  
J. T. Robinson, Kamloops, B.C.  
Jas. Ritchie, Summerland, B.C.  
Frank Rushton, Kamloops, B.C.  
P. M. Sauder, Calgary, Alta.  
W. E. Scott, Victoria, B.C.  
C. A. Semlin, Kamloops, B.C.  
J. P. Shaw, Kamloops, B.C.  
J. E. Shaffer, Didsbury, Alta.  
John Shields, Ashcroft, B.C.  
F. E. Simpson, Cranbrook, B.C.  
F. Smith, Kelowna, B.C.  
Frank F. Smith, Kamloops, B.C.  
John F. Smith, Kamloops, B.C.

Maxwell Smith, Vancouver, B.C.  
T. G. Speer, Kelowna, B.C.  
F. F. Starr, Okanagan Centre, B.C.  
S. Cuthbert Stuart, Fruitlands, B.C.  
H. R. Taite, Monte Creek, B.C.  
S. W. Taylor, Jr., Ashcroft, B.C.  
H. Thayer, Kamloops, B.C.  
E. C. Thrupp, Kamloops, B.C.  
J. B. Tiffin, Lillooet, B.C.  
C. A. Tregillis, Calgary, Alta.  
W. J. Tregillis, Calgary, Alta.  
R. A. Wallace, High River, Alta.  
C. H. Webster, Calgary, Alta.  
James White, Ottawa, Ont.  
R. H. Winny, Nicola, B.C.  
R. M. Winslow, Victoria, B.C.  
W. Winterbottom, Kamloops, B.C.

The CHAIRMAN.—I am glad to be able to say that this is a record for these conventions.

Mr. ASHCROFT, reporting on behalf of the Resolution committee, said that they had three resolutions and one petition, and he asked that the petition be referred back. He also requested leave for the committee to sit again on two of the resolutions, which were very important, and they had not had time to give the proper amount of attention to them. He reported on the following resolution as ready for presentation to the convention.

#### RESOLUTION No. 1.

‘Whereas irrigation projects have been and are being hampered by the failure in the B. C. Water Act to make provision for allowing water, which has been recorded and is appurtenant to certain lands, to be separated from said lands and thrown into and amalgamated as a part of a general project:

‘Be it resolved that this convention strongly urges the government of British Columbia to amend the Water Act so as to provide for and allow such separation and amalgamation.’

The CHAIRMAN.—This resolution is now before the convention, but I think it would be well to have all resolutions printed and distributed among the delegates. Perhaps it would be better to have a resolution to that effect.’

Moved by Mr. Robinson, of Kamloops, and seconded by Mr. Bulman, of Kamloops: ‘That the resolution be referred back to the committee with instructions to have it printed and distributed among the delegates, the same to apply to other resolutions.’ Carried.

Mr. HALL.—This petition is presented by Kelowna and is as follows:—

‘We, the undersigned fruit-growers and ranchers of the Kelowna district, respectfully desire to express to this convention our strong disapproval of the existing state of affairs in the way of water rights and water distribution within the province.



'As a permanent remedy to this we would ask the government of British Columbia to assume control of all water and water systems within the province, to institute an energetic policy of water conservation so that water now going to waste may be held in reserve for use when most required, and to so amend the laws relating to the distribution of same as to give adequate protection to all flumes, ditches, and gates, so that the same shall not be interfered with except by the person in authority.'

Mr. HALL.—I have here two other copies of this petition signed in the same way as that presented; there are over three hundred signatures.

Dr. DICKSON.—I would move 'That this petition be referred back to the committee on resolutions with power to draw up any necessary resolutions arising therefrom.'

Mr. HARVEY, of Kelowna.—I second the motion.

The CHAIRMAN.—I rather think in this matter there is a slight mistake. It has occurred to me that it is not the duty of the Resolution Committee to draft resolutions arising out of that. Their duty is to deal with resolutions presented by other people. I think that others should present to the Resolution Committee any resolutions arising out of the petition. It can be recorded that this petition is presented with so many signatures.

Mr. DICKSON.—I hardly think it necessary, Mr. Chairman, to print all the signatures. I move that the petition be received and filed.

Mr. HARVEY seconded the motion. Carried.

The CHAIRMAN.—If there are any other resolutions and petitions which delegates wish to bring forward at this convention, I would ask them to give them in to the Resolution Committee as soon as possible. I am asked to announce that the executive of the public library desires the delegates and their ladies to make use of the reading room whenever they please. The library is just down the street on the other side of the old court house.

#### HON. RICHARD McBRIDE.

The president then introduced Hon. Richard McBride, premier of British Columbia, who addressed the convention as follows:—

Hon. RICHARD McBRIDE.—Mr. Chairman, ladies and gentlemen: The primary purpose in my attending at the convention to-day is to try and demonstrate to the people of this country, and more particularly this convention, that the provincial government is heartily in sympathy with the object of your gathering. It is anxious to encourage in every legitimate way the splendid work which those who have taken up irrigation proposals in British Columbia are at this time devoting their attention to. I regret exceedingly that Mr. Ellison, the Chief Commissioner of Lands, and a member of the Kamloops district, and the man who to some considerable extent has engaged himself in irrigation works, has found it impossible to be with you to-day. It was first arranged that Mr. Ellison should come and attend on behalf of the administration but his other engagements have rendered it impossible.

Mr. Chairman, it is not for me to-day to state anything with regard to the tremendous work that is being engaged in in connection with the development of irrigation proposals in British Columbia. There are men, and we are fortunate in British Columbia that we have many of them, who have made a study of their subject, and who know and understand so well how to carry on irrigation projects in British Columbia, and I shall think it very strange in the development of this country in the next five or six years if property to the value of many millions of dollars in this section is not developed through the agency of irrigation. We all know and know only too well that there has been, in the way of provincial asset, property worth millions given to British Columbia in the last five years entirely through the agency of irrigation works, and any government which has to do with directing the affairs of the province, would be very neglectful indeed in its duty if it failed to encourage and as far as it could, to assist progressive works, such as irrigation. I listened attentively a minute ago to the different resolutions offered and while it may be a digression I will say that when the work of your convention has been concluded and the resolutions have been finally adopted, any that may refer to government in British Columbia will, if you send them to us, have our careful attention. We may not be able to meet all the demands of this body. The government may not find it well to carry out exactly the views that are outlined in these resolutions, but I may safely say on behalf of myself and colleagues that whatever you may see fit to send to Victoria, will have the hearty attention of the administration of British Columbia.

We have tried to assist the people of British Columbia. An illustration of our sympathy with and interest in them is shown in the legislation now in effect for two years, and which your president, Mr. Fulton, was mainly instrumental in introducing to British Columbia—the Water Act of British Columbia, which Mr. Fulton must be held mainly responsible for, for he personally saw to its being put through. You are in a position to know and judge one of the most useful pieces of legislation contained within the statute books of the province of British Columbia. The Act has been in force for two years and is a piece of legislation that is devised to meet satisfactorily conditions that are most felt here. I recall that before that Act was passed Mr. Fulton, who was then Chief Commissioner of Lands, said that it would be advisable to acquaint himself with the conditions as they existed, and in order that he might have the best assistance and advice Professor Carpenter was engaged to accompany Mr. Fulton throughout the province of British Columbia, and later on Mr. Fulton accompanied the professor to Colorado and made a thorough study of the district, where he secured data for this Act. I am very glad to say, ladies and gentlemen, that as far as our experience has gone to-day we have received from many parts of the province words of commendation of that legislation. It is not an Act that can be taken up and read and understood at first glance. It is necessarily somewhat involved but nevertheless so arranged that any intelligent person, or any other who takes the necessary amount of time, can understand it. I consider I am fortunate in being able to take advantage of Mr. Fulton's presence this afternoon to state that the country is under a great debt to him personally. I do not wish to overlook other gentlemen in this company, I need not mention them, who very kindly assisted Mr. Fulton in bringing down the bill on the statute books. In this connection I particularly wish to name Mr. J. S. Dennis, of Calgary. Mr. Dennis is a practical man

of worth. What other man produced in the irrigated section of Alberta what this man's genius has demonstrated to the people of Canada—that it is possible, with reasonable and responsible men, to reclaim and make productive large sections of the land that twenty-five years ago were worthless. I do not know of any man in Canada who can justly claim such a place in western development as Mr. Dennis. Mr. Dennis, during his trip of British Columbia, made a study of conditions and Mr. Fulton has never hesitated to tell me, and the legislature for that matter, of the very valuable work of Mr. Dennis in the preparation of the bill.

So much for the Act. You may say, 'What has the government been doing in order to carry out the Act?' There is the appointment of Mr. Drewey as chief water commissioner. Mr. Drewey is an engineer of wide and varied western experience and a man, I am safe in saying, who is competent and proper to hold the appointment. With him two other appointments have been made. The board is authorized to listen to disputes between parties and adjudicate thereon, and has power to enforce its decisions. Everything has been done and is being done to-day in a conservative way to encourage the locating of lands in the province of British Columbia. The law, as you well know, Mr. Chairman, and I think I am using pretty well your own language when I state that the law provides, first, for the settling of old disputes and the weeding out of dead records, and of data that is absolutely of no value, and of records that were issued for speculative purposes only and were never of any effect. At present licensees are required to make beneficial use of water rights. Provision is made for the storage of water for the purpose of conservation so that, as far as possible, we may save water now running to waste. Then the necessary matter of sale and barter; licenses for these purposes shall issue only to the municipalities and companies having the proper authority, either incorporated, licensed or registered in this province.

Now I have endeavoured to demonstrate in this very brief and hurried survey of the Act, that the government has shown itself anxious and willing to take it and administer it, but this cannot be done until we have the hearty co-operation of the people of British Columbia. The aim and desire of the government is to work for and in the best interests of the people. If we want to make good we must work together. What good purpose can be served or effected on the part of the government in enforcing laws that are not heartily accepted by the people and policies which the people do not consider fair or right. It is necessary for the people in favour of this Act to work with the government and by the government in this matter. It is not a question of politics but a question of bringing new lands under cultivation. We will have our difficulties and we must come together from time to time to settle our differences.

It is very gratifying indeed for those of us who knew British Columbia years ago and knew this section, to see these lands being brought under cultivation through irrigation schemes. Those of your own vicinity, Fruitlands, and down through the Okanagan, and those at Keremeos where a company has been carrying on a very extensive and very important irrigation work. And then we know of the efforts, and successful efforts, in the Columbia Valley, where extensive irrigation projects under the direction of Bruce are taking very definite shape, and at Nicola and other sections, where men and means together are doing everything possible by the introduction of

water to make the soil fertile and productive, and I cannot help naming Lillooet as being one of the most promising sections of British Columbia.

I would like to detain you for a moment or two longer with reference to one question that, more particularly in Kamloops and the railway belt, is being grappled with at the present time. That is the question of title to water lying within the railway belt. The Privy Council has heard the appeal of the province of British Columbia from the judgment of the Supreme Court of Canada, regarding the right of this province to control and administer all water rights within the railway belt and you may look to see the decision almost daily. It was imperative that this government go to the Privy Council to secure a final adjudication so that the matter might be put to rest once and for all. I am unable to give you any assurance as to what that decision may mean as far as jurisdiction goes. I am unable to say whether that jurisdiction remains with this province or goes to Ottawa, but I can safely assure you, as a Canadian, that whether it goes to Victoria or to Ottawa, vested interests will be held sacred and no injustice done and every title holder will be given legislative protection.

These are questions that arise from time to time that cannot very well be adjusted here, and the province of British Columbia, when they do arise, will consider that it is its duty to see that they get adjustment as expeditiously as consistent with regard to the administration of the power from Ottawa as compared with the administration of power from Victoria. I repeat and emphasize that whatever that decision of the Privy Council may be you can feel satisfied that the rights and titles of all parties concerned will be protected.

And now I want to again slightly express to you and to this meeting my very best thanks for the kindness you have shown to me in including my name upon the programme. It occurred to me that it was rather courageous of me to come into this hall, filled as it is to-day with men filled with the water project. My domicile does not happen to be in the dry belt and for that matter I cannot claim the same familiarity with irrigation work as my good friend, Mr. Fulton, who is a fellow resident, but I can claim as a resident of the coast, that I too have taken some interest in the development of the interior of the province through irrigation works and I can claim to have brought from the coast the interest of the people of the coast and their hearty sympathy with the interior and they watch with pleasure every mark of progress and development that year after year takes place in the interior of British Columbia.

In telling about the development of British Columbia we have been telling about the big trees, about the wonderful timber resources, about the immense mineral wealth, of our great fishery resources, of that immense sea farm we have off there in the Pacific, the salmon fisheries of the Fraser, and in mentioning the sea farm I would say it is one that in point of size and resourcefulness cannot be equaled by any other section of the globe. We have said a word about our greatness; we are very proud of the greatness of British Columbia, and while we have been telling about these big things it would appear that we have been leaving to the last to say very much about our fruit, but let me say that we have set a standard not only for the province but for the whole of the Dominion of Canada. Through the enterprise of the province, and especially of the people of the dry belt, Western Canada has been enabled to compete in the metropolis and to carry off the leading premiums, so that perhaps I can claim

to have referred to the greatest, after a somewhat considerable reference to the resources of mines and timber, and the game and fisheries, when I say we are bigger in our fruit perhaps than in any other of these wonderful natural resources. I have nothing but a good word to say for the fruit of Vancouver island and the Fraser valley. Possibly if I had property to sell in the Fraser valley I might be constrained to say that it produces about the best fruit I have ever seen, but my particular mission to you here in Kamloops, the sister capital with Vernon,—Kamloops lying as it does on the main line of the Canadian Pacific Railway,—is to tell you that you must get all the benefit of this enterprise regarding the development work in the dry belt of the country. Let me close by saying that it will rest with the government if it has any intention of assisting you in carrying on this work, as I have tried to show you this afternoon, to encourage the work so as to make the district that has been settled by you a worthy one indeed.

Mr. Chairman, if you will permit me I wish to say it is very gratifying to us all to see so many present to-day, representatives from Manitoba, Saskatchewan and Alberta, and from the other side of the line, showing the great interest being taken in this matter. By the way, the Chairman informs me that there is also present a gentleman from London, England. We have also with us to-day his grace, the archbishop of the province, showing the interest his church is taking in this subject. It is a very graceful compliment indeed to you, Mr. Chairman, and to your city of Kamloops and the province of British Columbia, that you have representatives from the western provinces and from the United States and from old London town, and I wish to express the hope from the bottom of my heart that the policy of this convention in mixing up with other provinces may be carried out with the same success and progress as its other policies.

The CHAIRMAN.—I am sorry that I omitted, not through an inadvertance but because I was not aware of the fact, to tell the premier, so that he could mention it, that there is a representative present from Yakima, Wash.

### THE BRITISH COLUMBIA WATER ACT.

The CHAIRMAN.—I am somewhat sorry that I have to call upon myself to give the address on the British Columbia Water Act. It was the hope of the local committee that on this subject we would be able to have Mr. Charles Wilson, K.C., here and have this paper either read or given by him. It was Mr. Wilson who drafted the Act for me and he spent a good deal of time and work in drafting it and in going over it section by section with myself and certain other gentlemen afterwards. He is a better speaker than myself and I am sorry it is not possible for him to be here to-day to give this address on the recent Act instead of myself. We sent him repeated invitations but he assured us he found it absolutely impossible, and that being the case, as an address on this Act was desired by the committee, it seems necessary to depend upon myself to give the same, inasmuch as I, as Chief Commissioner of Lands,

was the minister of the British Columbia government responsible for this particular piece of legislation, and in mentioning this I might add that there were only two matters that caused me any personal feeling of regret in getting out of politics when I did and one of them was that I had to leave or give up the control of this legislation. I was fully aware when it was brought before the House and after it passed the House, that it was not by any means perfect, and I had hoped, as the minister responsible for it, that I would have the control of it until it had been safely tested and tried and had become a good, capable, working Act. However, I believe it is in good hands and in the near future I hope to see very good results from it. If they do not come I shall be very greatly disappointed indeed.

Ladies and gentlemen, I have on different previous occasions at conventions and meetings of different kinds explained this subject. I have stated the reasons why our British Columbia government thought it necessary to introduce this Act, consolidating and amending the Acts relating to water in this province. When this province was a Crown colony there was no water Act. There was only the law as it existed in England and that as you know is merely confined to riparian rights. When placer mines were developed in this province it was very quickly found that in order to work them water had to be used, which had to be diverted and taken away from the source of supply in which the land was located. Under the laws of England which were in force in the province at the time, there was no provision for taking the water from the creek or source of supply, so it was found advisable and necessary to bring a statute into existence making provision for the taking of water for placer mining purposes. That was the inception of the legislation regarding water rights in this province. Following that we had settlers in the different dry belts of the mountain regions and it was found by those early settlers that they could not hope on these dry lands to raise crops successfully without making use of water by way of irrigation, and again necessity brought about the legislation which was found absolutely necessary and indispensable for bringing these arid lands under cultivation, and as a result the rights given the placer miners were extended by the legislature on behalf of the farmers and statutory rights were given to the latter to take water out of the lakes and creeks and to apply that water to the land, thus rendering possible successful farming and crop raising.

Now for a long period of years the legislation of this province was very inadequate and the Act did not properly provide, as it should, for all contingencies that might arise and another attempt was made to deal with it in 1897 when the water clauses which up to that time were contained in the Land Act, were framed into an Act called the Water Clauses Consolidation Act. That Act went a great deal farther than anything theretofore and as far as it then went, it was a piece of very good legislation indeed. After some years experience with that Act, however, it became evident that it did not go far enough; and it was on that account that the government of the province some years ago decided to thoroughly investigate this question and to attempt to pass legislation that would more fully, if not perfectly, deal with this question. For that reason we engaged Prof. Carpenter, of Colorado, an engineer known throughout the United States as a man of the highest ability. He came here and went through the dry belt with me and afterwards, as the premier told you, I went down to Colorado and went over some portions of the state with him. I had up to





White Valley Irrigation and Power Co., Ltd., Vernon, B.C. View of canal fifteen miles below Headgates.

that time looked upon Colorado as only interested in mining and a state whose products were chiefly mining products. I was surprised to find while I was there that so far from this being the case, out of some \$125,000,000 worth of products of that state, during the year I was there, not less than \$90,000,000 were agricultural and the greater part of that \$90,000,000 was the result of the irrigation that had been practised there in recent years. That is an object lesson in itself, because Colorado is fully as dry, if not drier, than our dry belt in British Columbia, and if they can bring about such results as that there is no reason in the world why we should not with proper statutory enactments, and proper carrying out of those enactments bring about equal results in this province.

After taking these steps then, the Act as it now stands on the statute books, was finally drafted and passed in 1909, and as this paper is on the Act it should be stated that on taking up the Act somewhat in detail I cannot go through it section by section. I cannot do more than take up the salient points of the Act and explain to the best of my ability the changes between the old and the new acts. The Act is somewhat voluminous. It consists of 333 sections, I think, and is almost the longest act on the statute books. It commences with an interpretation clause which is very much fuller than the interpretation clause of the old Act. It contains more definitions, that being considered more advisable than to place the definitions in the different sections as they might be required. The definitions that were in the previous Act were changed as little as possible and any one referring to the interpretation clause can see that where anything had been defined in the old Act, it has been adhered to as closely as possible in the new Act.

Section 3 shows how the Act is divided. It is divided into seventeen parts and this section gives the heading of the different parts, so that any one wishing to find out any particular matter under the Act can simply turn to section 3, see what heading the matter he is interested in might come under and turn up that heading and find what he wants. For instance every part deals with one particular matter and that particular matter alone. Titles and subjects are given in the margin and if any one wants to look up a particular point in any part all he has to do is to turn to that section and go down it until he finds what he wants.

Take for example the section relating to clearing streams for driving logs. That was an entirely separate Act previous to this. Applications under the Rivers and Streams Act, as it was known then, sometimes conflicted with applications under the Water Clauses Act, and for that reason, and because also it was deemed better to have the whole law relating to water and the use of water in one Act, that was included in the same Act.

Coming to part I, sections 4 and 5 are very important, but they are not new. The wording is changed a little from the wording of the sections in the old Act but the provisions are the same.

Section 4 deals with the rights of riparian proprietors to the use of water for domestic purposes, but subject to those rights of the riparian proprietors it enacts, as in the old Act, that no person shall divert or appropriate any water except under the provisions of this or some former Act, and further in that section, no right to the use of water in any stream is permitted except such as may have been acquired under this or some former Act. That particular legislation, if I remember rightly,

was first introduced in the provincial legislature and made law in the year 1894 and has remained on the statute books ever since. We have followed that, leaving it the same as it was during all those years, and I noticed that in the bill introduced by Hon. Frank Oliver, Minister of the Interior, at Ottawa, during the session of last year, a bill to deal with the water in this province, he followed our Act and commenced his bill with the same declaration as we have in ours by declaring that all water is vested in the Crown.

The question arises (it has never been taken into court to my knowledge to be decided, but the question arises under this section and under the definition of unrecorded water in the interpretation clause) whether or not records of water which is not made use of by the holder remain valid or not. The section declares that the right to the use of unrecorded water in any stream is to be vested in the Crown. The definition of 'unrecorded' in section two of the interpretation clause is: 'Unrecorded water shall mean all water which, for the time being, is not held under and used in accordance with a license under this Act, or a record under any former Act, or under special grant by public or private Act, and shall include all water for the time being unappropriated or unoccupied and not used for a beneficial purpose.' As I say, the question can arise under that section whether water recorded in past years and not made use of by the holder of the same is or is not unrecorded water within the meaning of the interpretation clause, and will be under section 4, vested in the Crown as unrecorded water. That has never been brought up in court and remains still to be tested. In dealing with that matter we did not think it right or proper to depart from the old Act. Those clauses have been on the statute books for some twelve or fifteen years, and we left them practically as we found them. With the question of how far this may affect records granted prior to 1897, which was the date of the passing of the Water Clauses Consolidation Act, I might perhaps deal more particularly with that when I come to part III of the Act, which provides for the method of dealing by the board of investigation with those records. I will take that up and point out to you the difference in the matter of dealing with those records under the old Act, and under the new Act as at present. Leaving that to one side for a moment, we come to part II of the Act, which provides a new unit of measurement. It is very short and I think very clear. It provides for the discharge of 1 cubic foot of water per second, flowing water, and the acre foot the unit of measurement of quantity.

Previous to this enactment the unit of measurement of flowing water had been known in this province for years back as the miner's inch. The miner's inch originated, I believe, probably in the State of California. It was in use in other states of the Union for a certain number of years but I am informed for years past it has been discarded as being altogether obsolete, and those of you who are familiar with the measurement of water in this province will remember that the miner's inch, or inch of water as defined in our old Act, was one-half the quantity of water passing through an orifice 1 inch wide, 2 inches high, under a continuous pressure of seven inches.

As I have said already, this method of measuring water has been discarded in the United States as obsolete and impractical and it can be readily seen how impractical it is, how difficult, nay more than difficult, impossible it would be in practical use. The only manner of measuring a quantity of water in strict accordance with the old Act was to have your measuring box of sufficient width to measure the whole quantity

you wished to use, only having an orifice with a head of 7 inches above that, so if you wanted to measure 400 inches of water you would require a measuring box 200 inches wide with that orifice 2 inches high and with 7 inches above that head. Any one can see at a glance that is impracticable or impossible. You could not put a measuring box like that in a stream or a ditch and as a matter of fact I think it will be admitted by every one who knows anything about the old system of dealing with water in this dry belt, that not 5 per cent of the measuring boxes in practical use could be deemed to be measuring boxes within that section of the Act; indeed it is not possible in practice to maintain that constant head of 7 inches above the orifice as at different times of the year the flow of water will vary and unless you had the fixed head of 7 inches above the orifice you were not measuring water in accordance with the Act. The new Act provides a very simple unit of measurement; it provides a cubic foot per second, which is the system adopted in many of the states and the Northwest and is very easily measured. In measuring the flowing water in a stream by cubic feet per second they have measuring boxes now that will measure the flow of water and give the flow per second and give it almost accurately.

Passing on to the part regarding the jurisdiction of the water commissioners and the decisions as to what shall be the duty of water for any particular piece of land or any particular crop. The duty of water is defined by the Act as the area of land that a unit of water will irrigate, as regulated by this Act, or any lawful authority. An acre foot is defined as a quantity of water that will cover one acre of land 1 foot deep. The water commissioners being called upon to define this duty of water after examining the land, can use discretion as to what in their opinion would be proper quantity of water to be used on that land, and they can by deciding in acre feet work out what the proper amount should be allowed to be put upon that land in cubic feet per second, because the thing can be worked out mathematically. As I say, having decided what the proper quantity of water to be used on that particular piece of land should be they work it out this way: 1 cubic foot per second will cover four acres 4 inches deep in twenty-four hours. If the commissioners decide that one acre-foot is sufficient for the piece of land, having come to that conclusion, they work that out in cubic feet per second and say you can use so much water, or so many cubic feet per second, over the weir in your ditch. In that way they can come to a decision that would be absolutely impossible under the old system of measurement.

We come then to part III of the Act, which provides for a tribunal—the board of investigation for dealing with water records and rights under the old Act. It was a very difficult matter to decide how to deal with those old water records, but one thing was certain, that it was absolutely necessary to revise them in order to get the water system of British Columbia on a proper basis. For one reason there are old record books all littered and strewn with records of water that no one to-day can make head or tail of. They are taken out in the names of men dead and gone years ago, and are only remembered in the minds of a very few of the earliest settlers. I have known myself records in books in this district with the same stream recorded under three different names. How can any one look up the water records of any particular stream, unless he is able to know or find out what name that stream bore for the last forty or fifty years? How is he to know where to look for a record against that stream? Further than that the records are entered under names of record holders

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that go back to the sixties and there are not many men now in the province who have been there during all that time and they cannot hope to remain here for many years longer. Although there may be a few having personal knowledge of who was here away back in the sixties how do they know under what name to search for records of water out of their particular region, and the longer this goes on the more difficult it will be, and the sooner this cleaning-up process takes place the better it will be for the province.

Now as I say, this part III provides for a cleaning up of the records, by a board of investigation consisting of a chief water commissioner and two or more persons, forming at least a commission of three, as the Lieutenant-Governor in Council may appoint. First of all they are to make search as far as possible of all records against all streams, creeks, or sources of supply. They are to have surveys made and determine the flow of water on any particular stream. They are also to make surveys in estimating what quantity of land can be made irrigable and brought under irrigation from the particular source of supply with which they are dealing. Having got this data they are then required to give notice to all the holders of records, to any they have been able to ascertain, by personal notice, further by advertisement in the local paper and the *Gazette*, calling upon all who claim to hold any record to the use of water on that particular source of supply, to come forward and file their claims with the board, and they shall name a particular date on which all claims are to be heard and adjudicated upon by the board. Having all this data before them, as full information as they can obtain of the amount of water available on the stream or lake, of the quantity of land that can probably be brought under irrigation from that source of supply, all the names of holders of records out of that source of supply, and the quantity of water claimed to be held under those records, the board is in a position to deal with and adjudicate upon the claims.

Now they are required, after having obtained all this data and having all the claims before them, and adjudicating upon those claims, to give first recognition to the old records and they are to reinstate them according to their order of priority, as they stand at the present time for the amount of water which in the opinion of the board each record holder is entitled to. The effect of this adjudication will be two-fold. It will settle and define all records out of any particular source of supply in the names of the record holders and it will settle and define the quantity of water which each of those record holders is entitled to. It was thought proper and advisable and necessary to give the board the power to cut down if, in their opinion, the amount of water now held under record is excessive, or if in any case the amount of water thus taken out was not the amount of water that was necessary for the amount of land, as in many cases the water record taken out was for water not for the amount of land but for the amount that happened to occur to the man who took out the water at the time he made his applications, some taking out 200, some 250, some 500, and some 1,500 miner's inches for not more than 320 acres of land. From the information that I have been able to gather in this part of the district, the usual quantity of water that any one claimed was required in this dry belt was not more than 1 inch to the acre as an average, and when you find records that average 5 and 6 inches of water per acre, records that have stood on those record books for twenty, thirty and forty years, you can see very easily how that is going to effect persons who

come in at a later date and wish to apply for records for water. As a matter of fact on most of our streams in this dry belt the amount of available water has been over recorded in some cases ten and twenty times and at most the amount of water in the streams is about one-tenth or one-fifth of the records that have been taken out on them. It is the first duty of the board of investigation to clear out the dead wood and get at the proper knowledge of each stream, of the water available and the water needed. They will know what water is available and they will grant that water to the record holders in accordance with their existing rights and ascertained requirements. I do not think that any one will have any right to complain of his record being cut down, provided of course, as I think you will take for granted, this board of investigation discharges its duties as required by the Act.

The only other point which I need refer to, and which I did refer to a minute or so ago is the provision in section 43 of the Act which has reference to those records which were taken out and granted before May 8, 1897. There is a difference in dealing with these records between this Act and the old Act. As I said a short time ago, there is the question of whether any record which is unused is valid or not. That is left just exactly as we found it when we passed this legislation. When the board of investigation comes to deal with these records granted prior to 1907, and which they find have not been used and are not being used, they are authorized to grant the applicant or holder of such a record a license, if in their opinion he is otherwise entitled thereto. That is, if that record is in their opinion not forfeited under section 4, read in connection with the definition of 'unrecorded water' in section 2, they are authorized to grant the holder of that record a license under certain conditions, those conditions being that the licensee should proceed with the construction and completion of his works under his record within one year of the time the board sits.

Now the reason for giving this power to the board of investigation was because in the Act of 1897 a distinction seemed to be made between records granted before and after the passing of that Act. We find under section 18 of the Act of 1897 that in the case of records obtained under that Act, or any act thereafter to be passed, but which had either been abandoned or not used, the commissioner, upon application of any owner of land, who would be entitled to apply for a record of unrecorded water, could cancel such existing record, whereas in the case of any existing record obtained under any Act theretofore passed, the commissioner could only grant to the subsequent applicant an interim record, and the owner of the existing prior record, upon giving not less than three months notice of his intention in that behalf, could bona fide resume under his original record the use of the water comprised in such interim record, or such part thereof as he might reasonably require, to be ascertained by the commissioner. In other words, records granted subsequent to the 8th day of May, 1897, could on application be cancelled by the commissioner on the ground of abandonment or non-user, while records obtained subsequent to that date could not. There was of course the same question of validity of records in case of non-user under section 4 of the Act of 1897, as there is under section 4 of the present Act, but they cannot be dealt with by the commissioner, and unless invalid, might be allowed to lie dormant for ten, twenty, fifty or one hundred years and then the holder could come forward and claim the right to the water, and cut out any subsequent record holder.

In framing the new Act, we deemed it best to recognize the distinction drawn in the Act of 1897 to the extent I have mentioned, namely, that if the board of investigation did not consider records granted prior to the 8th day of May, 1897, invalid under section 4 by reason of non-user, they will allow the license to be issued therefor, provided the holder of the record puts in his ditch and works and makes use of the water within a year.

The main principle of the Act is that the right to water under this Act is made to depend upon its beneficial use, and later on in the Act in a section I will come to presently, we have this provision, that if the powers granted by any license (which includes licenses substituted for old records) be not exercised for three successive years, then automatically that license is cancelled with power to the commissioner to reinstate the license, giving it the original or any priority he may deem just, but I take it that very special reasons and circumstances would have to be shown before the commissioner would reinstate such license in its original priority.

We come then to part IV, which first of all provides that every license to take and use water shall be issued with due regard to the requirements of riparian proprietors for domestic purposes. Section 49 defines and provides the priority of purposes for which licenses should be granted. Those purposes are, in order of priority in which they are laid down in the Act, as follows:—

First—Domestic purposes.

Second—Municipal purposes, which shall mean and include the supply of water by any company to city, town, village, or unincorporated locality for domestic purposes.

Third.—Irrigation of land for agricultural or horticultural purposes.

Fourth.—Steam, which shall mean and include water required for the production of steam for working railways, steam factories, and all other purposes, save the production of electricity.

Fifth.—Power, which shall include the use of water for any other purpose excepting mining, and

Sixth.—Mining, which shall include the use of water for any purpose in connection with mining.

Seventh.—Clearing streams for driving logs.

First.—Domestic purposes: The reason for that is I think evident to everybody, viz.: that water is absolutely essential for man and animals. It is very necessary to have legislation to know what purposes it can be used for and it was deemed advisable to make provision for the rights of riparian proprietors. The Act provides that the commissioner in dealing with the claims of a riparian proprietor and adjudicating upon the amount necessary for him shall go further and prescribe the method by which he shall convey it to the place where it is required to be used, thus preventing waste through seepage. It would not be fair to allow the riparian proprietor who wishes to use for domestic purposes half an inch a day to run the water over a place where it would sink and after running it over take his half inch on his own land. He might in that process lose perhaps 40 or 50 inches before he got his half inch, and the commissioner is empowered to prescribe the method of conveyance. He can say to the license holder that he is entitled to his half inch of water, but if that



water is going to be lost he shall take it through a pipe. If it is going to be lost in a method of conveyance that is not fair to other applicants he must take it through a pipe to his land and must prevent as far as possible loss from seepage.

The second purpose for which it can be used is municipal purposes for domestic uses.

The third is irrigation of land for agricultural and horticultural purposes, that being considered by the government as being the next important purpose for which water can be used after domestic purposes. We follow that with steam purposes, allowing for the working of railroads, steam factories, and other purposes that require water to give them steam power. Then come power purposes and mining, and the last, or number seven, is clearing streams for driving logs.

Part V provides for the procedure to obtain water licenses and the general rights acquired by the licensees. As far as possible we kept to the language of the old Act in dealing with this matter, but it was considered advisable to go a good deal further in some regards. For instance the particulars required to be furnished by the intending applicant in posting his notice and in applying are fuller now under the new Act. That was considered advisable in order that the applicant should give the commissioner who has to consider and deal with the applications, as full information as possible before he took the matter into consideration. It goes further and requires that not only should the notice be posted in the place where the water is to be diverted and used and in the office of the commissioner, which was provided for in the old Act, but the notice is now required to be advertised; if for not more than 4 cubic feet per second then in the local paper and if for more than 4 cubic feet per second in *The British Columbia Gazette* as well. That is for the reason that the public shall have better means of knowing for what reason the water is being recorded.

Just one more point I may make clear is this. There was no provision in the old Act specifying or defining which water commissioner had jurisdiction in a case such as the following. A case has happened that an application is made to use water out of a stream on land in the district of one commissioner, the point of diversion being in the district of another commissioner, and the applicant had great difficulty in knowing which of these commissioners had the right to give him the record. Section 54 of the new Act clearly provides that in such a case the water commissioner of the district where the point of diversion is situate, has jurisdiction, but it goes on to provide that the notices must be given in both districts.

Part VI defines the procedure to obtain approval of works. This is rather different where the license is for more than 4 cubic feet of water per second from the procedure where it does not exceed 4 cubic feet. In the case of granting a license for water not exceeding 4 cubic feet per second, the commissioner has power to approve of the works to be put in by the licensee. In all cases plans and what I might call specifications have to be furnished by the license holder of the works he proposes to put in. Where a license covers more than 4 cubic feet per second then these plans have to be submitted not to the commissioner but to the Lieutenant-Governor in Council. I might say that 4 cubic feet per second is equivalent to 140 inches according to the definition of a miner's inch in the old Act, so that taking the old system, when application is made for more than 140 or 150 inches of water the plans are to be submitted to the Lieutenant-Governor in Council for approval, instead of to the com-

missioner. But as it might be urged that in outlying districts this might work considerable hardship, I may say that in such a case the Lieutenant-Governor in Council has the right to extend the power or jurisdiction of the commissioner of the district and allow and authorize him to deal with and approve of the plans. Again in this part provision is made for giving and making more public notice of intention to apply for this approval. Under the old Act in part IV which deals with power companies and applications for approval of plans for power companies, there was no provision for advertising the intention to apply to the executive for permission for the proposed undertaking, so that everything had gone through and the public had no way of knowing what was being done. It was deemed in preparing our new Act that the public should know and if any one interested in any way had any cause to object he would have an opportunity (has an opportunity given him in this part of the Act), of going before the executive and prosecuting his objections and arguments against the proposition.

There is just one thing that has occurred to me in connection with this particular part of the Act. I never for one moment claimed for this Act that it was perfect. I anticipated from the beginning that in coming to deal with this Act in a practical manner and coming to view and test the different parts of the Act it would be found in a good many cases that improvements could be made. It has occurred to me in part VI of the Act in connection with part V, the Act does not make any provision for allowing individuals to use water for any purposes other than domestic and irrigation. Thinking it over it has occurred to me that cases might easily arise where an individual, without being called upon to form a company, might be allowed to take out a license for water for other than agricultural purposes. For instance an individual might have a sawmill on his ground which he would run by water power if he had the right to take out a license to use water for power purposes, which he has no right to do unless he had a license. I see no reason why that individual should not be allowed a license for water power for his own personal use, that is where he is not proposing and not arranging to sell part of it. I think it is a matter that could very well be considered by the government and the chief water commissioner and I would ask the chief water commissioner to kindly make a note of that and consider it before the next session.

Part VII deals with the general powers and privileges of municipalities and companies using water for domestic purposes. I take it that this convention is not particularly concerned with that section of the Act.

Part VIII is on the same line.

Part IX deals with powers and privileges of power companies. I think that this convention is not particularly interested in that.

Part X deals with municipalities as power companies.

Part XI refers to clearing streams for driving logs. And I might say that, that is simply put into the Act to make complete the whole question of dealing with water conditions. That formerly was in a separate Act altogether. As far as I know the convention is not specially concerned about that part of the Act.

Part XII. This is of very considerable importance. In the 1897 Act the only mention that was made of storing water was in, I think, three sections of the Act. One of them was a section which provided for the form of notice required to be

posted by the applicant for record of water, and the only mention made in that section was that in one particular part of the notice he was required to state the manner by which he proposed to store water, but there was not in that Act any provision made for the storing of water, or any provision by which a holder of a record was given any right or property whatever in the water so stored, and it was a question, and a very serious question, for any person or company who desired to store up water during the time when it was benefitting no one, when it was running to waste, to store that up against the season when it would be of immense benefit and advantage—it was a matter of importance to him or them to know if he or they had a right to that stored water on which he or they had spent money in so conserving and storing. The question was brought up in a case tried some two or three years ago and the judge held that water so stored up, as soon as it was turned into the creek, the original source of supply, became and formed part of that creek and subject to all prior records on that creek, and also if there was a scarcity of water in that creek, at the time the storer turned his water in, unless he turned in sufficient to supply the prior record holders and himself, the prior record holders could take it all and he could get nothing. That decision did not go further than the trial judge. It did not go to appeal and I believe I am right in saying that at the trial the California case which has a very important bearing on the point was never cited to the judge, or it might have had some effect on this decision.

Then in 1908 the first attempt was made by legislation in this province to provide for the storing of water and it gave the person storing water some right or interest in the water so stored. There were only three or four sections passed in that year and I was responsible for these, and I might mention I was indebted to Mr. Smith Curtis, who assisted me in drafting the sections that were put through by the legislature in that year. Last year the question was more fully gone into and some twenty sections were passed dealing with this matter of storing water, giving the right to store water and giving the holder of the license to store water the right and property in the water so stored by him and there were provisions made, which I need not go into particularly, whereby the holder of a storage license is required to give notice to other record holders on the creek of the time he intends to turn the water into the creek, for the reason there might be a matter of some dispute as to the quantity he turned in. He is therefore required to give the other record holders notice of the hour he intends to turn that in so that they can then determine for themselves what quantity he is turning in. If there is any dispute they can apply to the commissioner and he can go and measure the water, making allowance for seepage and evaporation, and decide how much water the holder, remembering the amount of water he is allowed to store and the amount he is actually turning in, ought to take out, being mindful to allow the amount of seepage and evaporation along the natural bed of the creek. The amount of water that he is allowed to take out of the creek and put on his own land is then fixed by the commissioner and there is further provision made that in the storing of water the license holder shall allow a sufficient amount to run down for domestic purposes when required, and he shall not keep back or pen back the natural flow of the creek if that is required for any holder of a license for agricultural or other purposes along the creek, the right given him being that he shall have the right to pen back and store the water that would otherwise go to waste and be of no use to anybody.

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We come then to part XIII. This provides very fully for the taking and using of lands, starting with the point that license holders have all taken Crown lands and hold land for the purpose of their works. I do not think I need go into that part of the Act at any length.

Part XIV. This is of very considerable importance, dealing with the obligations, duties and limitations imposed on licensees. The provision of section 250, as I said before, is the main benefit of this Act. Every license issued under this Act is for the beneficial use of all quantities of water taken or used, and notwithstanding the quantity of water granted by any license, no licensee shall to the prejudice of others, divert more water from any stream than can for the time being be beneficially used by him, and the exclusive right shall be limited to the quantity of water his works will carry. That, with the other sections makes it clear that the chief provision of this Act is that the water shall be beneficially used by the licensee.

Then comes section 253, which automatically cancels the license if the water is not used for three consecutive years. And in section 265 the duties of the water commissioners in regard to the matter of determining the duty of water is provided for. That is a matter I mentioned a little while ago. It goes on to deal with the power companies and limitations for power purposes and in respect to placer mining and so on.

Coming to part XV we have some very important points in this part. First of all in section 287, we have the powers of the water commissioners defined. It provides that the water commissioner shall in the district or districts for which he may be appointed, have immediate direction and control of the management and distribution of the water, and shall have such powers, not inconsistent with this Act, as are conferred by this Act and rules, and discharge such duties as are imposed upon him by this Act or rules. The rules I believe have not been formulated but will no doubt give the water commissioner full powers not inconsistent with this Act. The idea of the Act in this respect was that it was most important that in case of disputes the awarding of the water as speedily as possible was desirable. I have personal knowledge of a case of dispute in this part of the district where it was two years before the case came to trial. The water commissioner has power under this Act to decide and control the amount and distribution of water. He shall make a personal investigation, and if he is a man of experience and judgment he will give a speedy decision right on the spot, which after a little trial will be found to be common sense and will be accepted after a more or less short trial of this Act without demur by the disputants. Now you all know there is no more hard feeling brought about in a dispute of any kind than can be brought about and is brought about in a dispute over water. I have heard Prof. Carpenter explain in speaking on this very point that the word rivalry is derived from the Latin word meaning stream, showing that disputes even in those days were rife among the people along the streams, and only recently we had a sad illustration in the city of Vernon. Two years ago, just about the time of the convention that was held in that city, we had the case of one man shooting another in a dispute over water, and I have in the course of my practice had clients come to me and threaten that unless the party they were disputing with gave in they were going to do some shooting, and I imagine that nearly every one of you who has had anything to do with this question of irrigation has a knowledge of the bitter feuds

that are brought about by disputes about water. I believe that if we have a good body of men as water commissioners with the full powers as contemplated by this Act that it only will be a very short time before, in the working out of this part of the Act, the parties interested will come to accept their decisions, not with entire unanimity, perhaps, but they will accept, and these feuds will be to a very large extent avoided.

Part XVI provides for the rules and regulations which the Lieutenant-Governor in Council may from time to time make, including among others the powers, duties of and jurisdiction of the water commissioners, and other persons necessary to give effect to this Act. It provides penalties for a breach of any provision of this Act.

Part XVII of the Act is the concluding part and all that I can say about that is that all rights and privileges acquired under any previous Acts are preserved.

I have gone perhaps more fully than I should have done, or intended to, into this question although there are a good many parts that I have not touched and which I could not endeavour to touch. If, however, anything I have said makes the conditions of the new Act clearer to the members of this convention I am very glad and I thank you ladies and gentlemen for the very kind attention you have given me.

If you have any questions to ask on the Act I shall be very glad to answer them to the best of my ability.

Mr. SEMLIN.—Has any part of this Act been submitted to the Supreme Court or the Appellate Court, and if so what have the decisions been?

The CHAIRMAN.—Not so far as I am aware. Up to the present time, under part III, that is the part that provides for the board of investigation, there have been no appeals, but the section provides for such an appeal. There have been no appeals as far as I know. The Chief Water Commissioner could inform us on that point.

Mr. DREWRY.—There have been no appeals.

Mr. McKELVIE.—Suppose a man take out a record for the use of water he desires, and another man subsequently takes out a record on a stream running into that above the first man, what is the relative position of those two men? Can the man who took out a subsequent record, shut off the water from the man who holds the prior record below?

The CHAIRMAN.—I cannot put my finger on it at a moment's notice, but my opinion has always been that a record on a stream includes all water that is a source of supply to that stream. As I take it, if you have a record for a particular point you have a claim on all water admitted above that point, and my opinion is that in this Act there is a special provision for that, making it clear that a license on a creek covers all water above the point of diversion of the water recorded.

Mr. McKELVIE.—Would you be kind enough to look into that before the convention adjourns. I have been told that there is nothing in the Act.

The CHAIRMAN.—Do you remember Mr. Drewry?

Mr. DREWRY.—There is no special mention but I think it is a matter of common sense.\*

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\* Section 64 of the Act covers the point raised by Mr. McKelvie.

Mr. PEARCE (Calgary).—There is one matter in the Act, part VI, section 73, that it seems to me might be amended in this way: that a homesteader going up possibly sixty or one hundred miles north is generally a man of small means and may possibly find it difficult to get the money to employ an engineer to make the surveys. I would suggest that should be amended so that the government should send an engineer and if the man is not in a position to pay at once the fee for the survey which is required by the Act, it should be made a charge against the pre-emption and paid at the time the Crown grant is obtained. In this way I think the business would be done in better shape and a possible hardship would be removed. And another point that I notice in the Act is that the water commissioner is not assisted in any way in effecting the enforcement. I do not know if there is any rule laid down for this and I only mention it as there are some matters in the Act that I do not understand.

Mr. MARTIN BURRELL.—I have a letter put in my hands which I would like to read.

‘COLBROOKE RANCH, KAMLOOPS, B.C.

‘August 1, 1910.

‘The Irrigation Convention,

‘Kamloops,

DEAR SIRs,—We would like to bring before your consideration a few points which we have gleaned from our experience in irrigation in the dry belt.

‘Holders of first records on bona fide creeks and reservoirs are not at present protected by the government or its officials or by the law. To illustrate our case:

‘We hold first records, dating from 1872, on creeks and reservoirs and every year have our water stolen, simply because the government through its officials will not protect us. This year being very dry, in spite of there being enough water to cover about 300 odd acres (as per surveyors’ measurement thereof) we had it all stolen, and our ranch with lots of timothy, clover and wheat as a result burnt out.

‘We notified the gold commissioner, who takes the water records, that our water was being stolen. He said he had no authority to proceed against those who were doing it, and if he were notified from headquarters he would know how to proceed. He suggested our seeing a lawyer. We then went to the provincial police and were notified that it was civil and not criminal and that the police could not do anything unless given the authority. We asked if stealing our bread and butter was not criminal. We then went to one of the water commissioners and were told he could only act on water questions out of the railway belt and he also had no authority.

‘We then went to the warden of the jail, who as such warden has control of first records on the same creek, to see if we could get him to put men to patrol the creeks and he would not do anything until he heard from headquarters.

‘Finally we wrote to the Attorney General, and his deputy’s advice was to go to law.

‘Now is it right, that while these meetings are being held, and resolutions passed and the governments are fighting over water ownership, law and order should be forgotten and despised.

‘We record holders have actually to go up and patrol our creeks and reservoirs, and smash dams, ditches, &c., put in to divert our water, even as late as 12 o’clock

## WESTERN CANADA IRRIGATION ASSOCIATION

midnight, only to have them repaired again and again, till there is not a drop of water coming down to us. If a man steals, say, loaves of bread or a watch, the police and the whole criminal system is directed against the thief, without practically any cost to the owner.

‘Now, if one man or a dozen who have settled above you, illegally take your water, and so in consequence you lose your crops, the government sits tight and smiles and the bona-fide holder of water runs a chance to go broke. For example, we put up over 400 loads of timothy and clover on only one part of our ranch, this year we haven’t put up fifteen—all the rest is burnt up.

‘Now we consider the government should step in and protect us who have lost, let alone grain crops, at least 300 tons of hay worth at its present market price, \$20 a ton, without having to patrol our creeks day and night, and then be put to the expense of \$50 for each injunction, and at the end be financially poorer than if we had not appealed to law. The man who owns a subsequent record or no record at all, and who steals water under present conditions is a good deal better off than the man who has paid the government for the right to use the water.

‘Moreover, an injunction though upheld one year, does not hinder the same man stealing water the next year and every year after. He has to be caught in the act, and the farce of injunctions, &c., gone through, and the case proved afresh against him every time. We would like to suggest that whichever government appoints water commissioners to look after the water system within the railway belt, at once, should appoint bona fide surveyors, civil engineers, who do understand the measurement of water and everything pertaining to irrigation (vide our last letter which was read at the Vernon convention) irrespective of the political party to which they belong, the reason for this being that unless the government can get and pay genuine and reliable and trustworthy experts the country will have a bigger set back and be in a far worse shape than if left alone. It is no use to put in incompetent men, be they farmers or otherwise, who have not had a successful experience in irrigation, and who do not understand the needs of the various soils and crops and the amount lost in seepage and by evaporation. Moreover, the welfare of this country demands men of absolute integrity, who will not favour their own personal friends to the detriment of those who hold prior records.

‘Another vital point which affects the whole dry belt is that new settlers coming in, and settling higher up the creeks are slashing down the brush on either side of the creek beds, thereby causing greater evaporation. In the course of time this proceeding, if not put a stop to, will dry up the water supply of the country. We would like to suggest that the government pass a law and see to its enforcement, that wherever the creeks run, 15 yards of brush on either side should not be cut down or slashed. We would like to draw the attention of the convention to the important fact that the settlers are often taking out records on lakes which are merely pot-holes, turning the few inches of water into the creek, to take out later as much as they want, perhaps 500 inches, and the prior record holder has no means of stopping this, except by getting a surveyor, measuring the water in the pot-hole, and what is taken out and then going to law.

What we would like to suggest is that this convention pass a resolution that the government act at once and enforce the law already made, giving the police authority



Reinforced Concrete Drop and Regulating Gates. Arkansas Valley Sugar Beet and Irrigated Land Co., Colorado.



to act in cases where the stealers have been fined previously, otherwise, if matters continue this way, we and other record holders will be ruined, and all our money and time will be lost. This state of affairs is bound to affect settlement and the welfare of the country in general.

Another proceeding which is a farce under the present law, is that a man can put flumes, ditches, &c., with impunity into your creeks to steal the water and irrigate his land, but if you cannot actually catch him turning it on, or owning he took it, you cannot proceed against him. You might race up and down the creek twenty times and if he is fortunate and can see you coming he can turn it loose, and even if you see dead water in his ditch and see his land all soaked, and the ditch cut in several places, in his field for irrigating, he can laugh at you and you cannot touch him.

One party when asked if they had taken the water, said 'No,' and told us that we hadn't caught them, but added, 'At any rate there is not enough water to come down to you.' What is the inference?

We hope that you gentlemen will not take anything amiss, but we have experience in irrigation, and have come to you for information and would appreciate your views and action on the subject.

'We remain, your truly,

'GEORGE BROS.,

'Per J. GEORGE.

Mr. JOHN GEORGE.—I might say we got up that petition and got Mr. Burrell to kindly read it. We have been here ten years and we should go out and shoot the whole crowd, and that is the way they deserve to be treated if the government will not protect us.

Mr. HALL.—If there are any amendments or resolutions that the members of the convention would like to make we would be glad to have them.

Senator BOSTOCK.—There is one matter that I would like to speak about. During the last session of the Dominion House there was a bill introduced by the Minister of the Interior. As a matter of fact that was introduced but it never went through the House. There was considerable discussion and argument but nothing was done and up to the present time as far as I know, the Dominion government has done nothing at all in regard to the water in the railway belt. Mr. Chairman, you referred to it as an Act, I believe, and I thought it proper to state that to the people who are very much interested in it, so that if these questions come up they will know if the matter comes up before the Dominion government that they can put their views before the government, and post their representative.

The CHAIRMAN.—Thanks for the correction; I called it an Act instead of a bill.

Mr. CURRIE.—In reference to that letter I might say that if the Act was administered—that is if the officials were all appointed and the Act in full force, in working order,—that the difficulties mentioned in that letter would not be met with.

Mr. GEORGE.—I would like to say that there are a number of surveyors appointed to work for the water interests outside of the railway belt. Why can not the surveyors be appointed to the work in the railway belt? It is more important to us in the dry belt.

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Mr. BURRELL.—I might say that the bill that Hon. Mr. Oliver brought forward was to deal with the jurisdiction of the Dominion government in the railway belt, pending the decision of the Privy Council. As you are aware the case decided by the Supreme Court of Canada took the jurisdiction out of the hands of the provincial government and the provincial government appealed to the Privy Council. There was a great deal of discussion in the House over the bill and it was thought that any further legislation might make things rather confusing later on and it was considered better not to do anything until the Privy Council had brought down their decision, and the decision is expected very soon, and if the matter is decided in favour of the Dominion House then you can apply to Senator Bostock.

Mr. CURRIE.—With reference to part XII, section 203, subsection 8, it says that in connection with restraining, either wholly or partially, the proposed penning back of the water or determine the quantity of water, if any, permitted to be penned back, and the days and hours when such penning back will be permitted, but he (the water commissioner) shall not go up until some prior record holder makes complaint, to judge that matter, and in the meantime the water may have been stored for several months. Now has a man a right under this section of the Act to go ahead and store water until restrained by the water commissioner, and is he entitled to the water so stored during that time?

The CHAIRMAN.—The first part of Mr. Currie's question seems to answer itself. The question is, is he entitled to store that water until he is restrained. The fact of the water commissioner being given power to restrain him seems to indicate that he is not entitled to do so. If he has the right to do it then the water commissioner has no right to restrain him. If he is not entitled to do it we come to the point of restraining him and should restrain him on application being made to do so. If he restrains or pens back water without being authorized to do so, somebody is going to object very quickly and then it is the duty of the water commissioner the moment objection is made, to go and make an examination and decide whether he should be allowed to use the water so stored. As to his being entitled to it, that would be a difficult matter, as it would be hard to say how much he had stored. I would not like to volunteer an opinion on that point.

Mr. CURRIE.—I would like to get this thing set right from my point of view. The question of storage comes up in any water when the prior record holder is preparing to use it for agriculture. Does this portion of the Act in relation to storing of water, give a man the privilege of storing during those times without applying to the commissioner to store it? It says here days and hours when such penning back shall be permitted.

The CHAIRMAN.—He has the right to store it under the Act. This is only in cases of objections being taken. Until the objection is taken the license holder has the right to put in his dam and hold back the water and the prior record holder, if he is not requiring to use the water, has no reason to raise an objection.

Mr. CURRIE.—Then all water that a man stores prior to the objection taken according to the Act he is entitled to it?

Mr. CHAIRMAN.—I would not like to say without considering it. The question was never brought up before. I would not like to venture an opinion off hand.

I would make a suggestion to Mr. George, and that is this; that in order to get this matter before the convention he should draft a short resolution and put that in the hands of the resolution committee, possibly along the lines of urging the government to take steps to formulate rules for the guidance of water commissioners along these lines. I mention this in addition to what Mr. Burrell has said. Inasmuch as the legislation in this railway belt is seriously complicated, the water commissioners were instructed not to interfere any way, on account of the Supreme Court of Canada deciding that the province of British Columbia since 1880 had no jurisdiction over water in the railway belt. That being the decision it was binding on the province until it was reversed, if it was reversed by the Privy Council on appeal. If the Privy Council should agree with the decision of the Supreme Court of Canada, that decision is binding on the province and consequently the province has no jurisdiction over water in the railway belt. It is complicated further because records were granted prior to that date, as it is admitted that the province had jurisdiction before that date, but the question comes in, who has the jurisdiction to settle disputes, and that is very uncertain. I would not like to venture an opinion as to whether records which are admitted by all parties, and granted by the province prior to the granting of the railway belt, are valid—whether they have any standing as to water questions arising now.

MR. GEORGE.—Do I understand you to say that records granted prior to 1880 are valid, and if so the provincial government should uphold them?

THE CHAIRMAN.—It is a question of who has jurisdiction prior to 1880. There is no question by the Dominion government that records granted prior to the creation of the railway belt are valid, but the question arises now, if the provincial government has no standing now, which government is it up to to deal with these matters. I would not like to say.

SENATOR BOSTOCK.—The province is in the position of appealing from the Supreme Court of Canada, to the Privy Council in England and if I am rightly informed the Privy Council heard the appellants, the side representing the province, in the matter and they said it was not necessary to hear the respondents, the Dominion government. They have reserved judgment. You as a lawyer know that a judge, as a rule, when he does not hear the other side, the side heard by him has not been sufficiently strong as to require the other side to respond. And we might almost assume that the Privy Council has decided that the water is in the hands of the Dominion government since 1880. I did not have a copy of the bill that was introduced by the Minister of the Interior at the last session, when speaking a moment ago but I have one now. It is called Bill No. 187, and the particular section I wish to read is No. 6 and is as follows:—

The Governor in Council may, upon the recommendation of the minister, provisionally confirm and validate any instrument professing to grant any right, record, power, privilege or priority for the use of water within the railway belt for domestic, irrigation, mining, or other purposes, issued on or after the eighth day of May, one thousand eight hundred and eighty and prior to the tenth day of May, one thousand, nine hundred and nine, to any person, company or municipality under the authority of any Act of the province of British Columbia,

Provided that any such validating order or confirmation shall be limited to a period not exceeding two years from the date of the coming into force of this Act, and that at and after the expiration of the said period the instrument so provisionally validated and confirmed shall be considered for all purposes as if this Act had not been passed and as if no validating order or confirmation thereunder had taken place.

The reason I read that clause is that I want to show to the persons interested that the Dominion government is anxious to deal fairly with everybody that has records in this railway belt that were granted after May 8, 1880, and prior to May 10, 1909. I presume that the latter date refers to the time the bill was introduced. I think I can assure the members interested that the Minister of the Interior and the Dominion government are only anxious to deal with matters of this kind in a fair and equitable manner and they have no intention to interfere more than necessary with any person's records of water in the railway belt except as may become necessary after a thorough investigation, to interfere.

Mr. ASHCROFT.—We have in our hands a copy of a resolution simply setting forth the sections of Bill No. 187 and requesting that this convention should request the Dominion government to introduce No. 187 and if possible——

Mr. PALMER.—May I ask if that resolution will be printed?

Mr. ASHCROFT.—We hope to have all the resolutions in hand and printed before the close of the session and it will come up Thursday morning for discussion.

Mr. HAWKS.—I would ask to be allowed to speak a few words to make a suggestion that I think might expedite matters and clear up a number of these resolutions and help to forward irrigation matters in British Columbia. Coming as I do from the States and from the part of the States where the shotgun is a very favoured method of enforcing the law, when I met Mr. Drewry I asked him how he was and he said he was well, and I asked him as to his troubles and he said 'I have no troubles as yet,' which simply means that the enforcement of the Act as indicated by several has not been seriously taken up. I think Mr. Drewry's position is something like the man who died and went up to the gates of heaven where he was met by St. Peter. St. Peter asked him on what grounds he asked admittance and he said: 'I have been twice married and each time my mother-in-law lived with me, and St. Peter said "come in."' And I think after a few years Mr. Drewry will report that he has had his troubles too. It rests with every one of us to do something that will be of real service to himself, and the province and every one interested in irrigation. Every one may find too well how true are your words when you said that the records litter the books and make it very difficult to trace them. They are all through the district. Several of us have spent hours in trying to unravel them and several of us have had to solve for themselves the equations that have been presented, and if all records were sent forward to the water commissioner for filing in his office—we all know too well the method of recording on streams, persons who get records on streams that are not only five and ten times over recorded but one hundred times over recorded.

It seems to me that where a man does not use the water, he has no right to record that water. If in the course of our researches we find things of value that will have

to be dealt with in solving this equation we should give the water commissioner the benefit of our researches and give him the opportunity of seeing what the results of our investigations have been. Every storage basin, every stream which we have occasion to measure and of which we know the velocity, make a copy and send to him so that in time when he comes to deal with it he could deal with it intelligently, and in that way we can work together.

Mr. DREWRY.—I would ask to be allowed to say a few words in reply to Mr. Hawks. As regards his implication that we were not administering the Act, I would say this is a very large province and we are doing everything with the means at our disposal. Every man thinks that his case should be considered first. As to my reply to him that I have no troubles, I do not tell all my troubles, even to the policeman.

Mr. ASHCROFT.—I move the convention adjourn.

Mr. HENDERSON.—I second the motion. Carried.

### EVENING SESSION, WEDNESDAY, AUGUST 3.

Mr. ASHCROFT reported on behalf of the resolution committee as follows: We have passed the resolutions into the hands of the printers and they will be in the hands of the delegates to-morrow morning.

The CHAIRMAN.—We have first on the programme an address by Mr. James White, Secretary of the Canada Conservation Commission, on 'Conservation.' I might say that the committee tried to get the Hon. Clifford Sifton to address the meeting but he was unable to come and he has got Mr. White to come here and give us this address, which he has very kindly consented to do, and I have very great pleasure in introducing Mr. White to the meeting.

#### MR. JAMES WHITE.

Ladies and gentlemen,—As Mr. Fulton has said, I appear here as a substitute for the Hon. Mr. Sifton, who was unable to appear. Instead of an address I have prepared the following paper on 'Conservation.'

'In 1903 President Roosevelt addressing the Society of American Foresters, urged strongly the necessity of conserving the forests to maintain the stream flow for irrigation, for water power, to prevent great floods and for the maintenance of the lumber industry. In 1907 when appointing the Inland Waterways Commission, he declared that it was not possible to frame a comprehensive plan for the conservation of the streams "without taking account of the orderly development of other natural resources." Later, on the recommendation of the commission, the president called a conference of the governors of the states of the Union and of experts on the conservation of natural resources. This recommendation to the president contains a notable statement respecting the urgency and necessity of conservation that deserves to be quoted in full.

“Hitherto our national policy has been one of almost unrestricted disposal of natural resources, and this in more lavish measure than in any other nation in the world's history; and this policy of the federal government has been shared by the constituent states. Three consequences have ensued, first, unprecedented consumption of natural resources, second, exhaustion of these resources, to the extent that a large part of our available public lands have passed into great estates or corporate interests, our forests are so far depleted as to multiply the cost of forest products, and our supplies of coal and iron ore are so far reduced as to enhance prices; and third, unequalled opportunity for private monopoly, to the extent that both the federal and the state sovereignties have been compelled to enact laws for the protection of the people.

‘I regret to say that what President Roosevelt said on the other side of the line applies to this side of the line also.

The conference was held at Washington May 13-15, 1908, and resulted in the establishment of a National Conservation Commission and of thirty-seven state conservation commissions. As an outgrowth of the joint conservation conference in December, 1908, President Roosevelt invited Canada, Newfoundland and Mexico to join with the United States in a North American conservation conference. This invitation was accepted and, in the following February, the commissioners met at Washington, Canada being represented by Hon. Sydney Fisher, Hon. Clifford Sifton, and Dr. Beland, M.P.

The conference formulated a declaration of principles which, in brief, declared:—

‘That the prosperity of each of the nations on this continent is dependent upon the conservation of its natural resources.

‘That concurrent measures should be taken to conserve them and to ascertain their location and extent.

‘That they should be developed, used and conserved so as to obtain the maximum of benefit for ourselves and for posterity.

‘That all results obtained be communicated by each commission to the other.

‘That the president invite all nations to join together in conference on the inventory, conservation and wide utilization of world resources.’

As a result, the government of Canada established a commission of conservation, consisting of twenty members appointed by Order in Council, of whom at least one must be a member of the faculty of a university within that province, if there be such university, and of twelve ex-officio members consisting of the Ministers of Agriculture, Interior, and Mines, and the member of each provincial government who is charged with the administration of the natural resources of such province. No commissioner can receive any fees or emoluments, but is repaid the expenses incurred attending annual and committee meetings. At the first annual meeting in January last, seven committees were formed to deal with fisheries, game and fur-bearing animals, forests, lands, minerals, public health, water and water-powers, and press and co-operating organizations.

In dealing with the natural resources of half a continent, largely undeveloped, and a large portion of which is absolutely unexplored, the student can be pardoned, if his feeling on contemplating the enormous field for investigation, is one of dismay. While much has been done it is insignificant compared to what remains to be done. The mere collection and collation of all available information will be of great value

and will form a basis upon which we can build the new material and will have a value as a partial measure of our ignorance as well as of our knowledge.

#### MINERALS.

Mineral wealth requires special consideration, inasmuch as it cannot be replaced. Streams flow as long as rain falls; crops can be raised indefinitely if certain constituents are replaced; the forest primeval can be succeeded by another, but the mineral deposits that have been forming through untold ages, once mined, can never be replaced. It is, therefore, incumbent upon us to so develop them that posterity will bless and not curse us.

The products of our mines last year were valued at \$90,500,000, comparatively insignificant, if compared with the \$2,000,000,000 of the United States, but encouraging when compared with the production of \$14,500,000 in 1889 and of \$49,234,005 in 1899.

In 1909 we produced 11 per cent of the world's production of silver, 70 per cent of the asbestos and 63 per cent of the nickel, the three minerals in which we particularly shine in regard to the world's production.

The coal resources of Canada have been roughly estimated at 150,500,000,000 tons, of which 6,500,000,000 tons are credited to Nova Scotia and New Brunswick and 144,000,000,000 tons to the prairie provinces and British Columbia.

It is estimated that, up to the present time, one ton of coal has been wasted for every ton mined. Until within the last ten years  $1\frac{1}{2}$  tons of anthracite was wasted for every ton mined, and even to-day, 1 ton is wasted for every ton and a half mined

Of the principal losses:—

(1) Larger pillars of coal should be left to permit robbing, later, and thin seams should be mined longwall.

(2) Upper seams should be mined first to avoid their total loss by falling roof.

(3) Coal of low grade and from thin seams should be used in the mine plant.

(4) The slack should be briquetted.

(5) In the manufacture of coke, by-product ovens that will save the gas, tar, ammonia, &c., should be used. One of the largest items of expense in briquetting is the binder. The coal-tar from the coke could thus be utilized at the mine.

(6) A very serious waste is due to the use of the 'bord and pillar' system whereby 15 per cent to 30 per cent of the coal is lost as compared with about 6 per cent when mining longwall.

It should be borne in mind that long before the coal supplies are exhausted, there will be a gradual decline owing to increased cost and scarcity. The recent advances in the price of anthracite are due to the exhaustion of the thicker beds and to the increased cost of working.

In the Cobalt mines, when first opened, the low grade ore was thrown on the dump with the rock and waste. Many of these mines are either recovering this ore themselves or have sold the 'dumps' to other operators who will do so. All this re-

handling represents a waste and, in addition, when mined, silver sold at a much higher figure than it does to-day. The tailings from the 240,000 tons milled this year will carry nearly 1,500,000 ounces of silver. By the end of 1910, there will be upwards of 2,200,000 ounces in the dumps, worth at present prices nearly \$1,250,000,000.

More important than waste of materials is the loss of human life in our mining operations. In 1909, the death rate of the men employed underground in the producing mines of the Cobalt district, was 12 per 1,000 as compared with 1.08 of the men employed above and below ground in English metalliferous mines.

While conceding that the needs of the present generation should not be curtailed, that they can and should use efficiently all of our resources that they require, and that they should not be forced to mine unprofitably, there are some basic principles of conservation that should be enforced, viz.:—

(1) That we of to-day are holding these resources in trust for our children and for many generations yet unborn.

(2) That coal lands should be leased for a sufficient length of time and at a rate low enough to ensure a fair profit to the operator.

(3) Wherever possible, water-power should be substituted for power generated by the consumption of fuel.

(4) Briquet plants should be installed to utilize the slack.

(5) All important mine plants should be of fireproof construction.

(6) Explosions in coal mines are due either to gas or dust. Good ventilation will prevent the former and dust can be kept down either by daily spraying with water or by sprinkling calcium chloride, which has a great affinity for moisture, every three months.

(7) Under favourable circumstances, sulphuric acid can be profitably recovered from the waste gases of furnaces smelting sulphurous ores. Thus the Tennessee Copper Company is recovering it and utilizing it in the manufacture of superphosphate. In Great Britain legislation forced the smelters to treat their furnace gases and, in some instances, the by-products showed, eventually, a greater profit than the mineral recovered. This result was achieved in the face of the most bitter opposition on the part of those, who, ultimately, received most benefit from it. Ten years ago any one visiting the Copper Cliff smelter near Sudbury, Ont., would, under certain weather conditions, find the atmosphere as near a reproduction of hades as is possible on earth. To-day by the elimination of most of the heap roasting, conditions are excellent and the mineral is recovered at a much lower cost.

Experience teaches that nothing that contains material of value should be thrown away as worthless. In the copper mines of Arizona, all the old filling in the slopes and the slag have been re-treated, involving a double waste of fuel and double waste of labour. At hundreds of mines in North America gold-tailings running several dollars to the ton have been washed into the streams and lost forever. Had they been impounded, they could now be cyanided and practically all their contents recovered. Hundreds of thousands of dollars worth of copper have been recovered from the mine waters of the Butte mines.



## THE FORESTS.

Up to a recent date our forests were assumed by most people to be practically inexhaustible, and even those of us who were convinced that the amount of our merchantable timber was grossly exaggerated in the various estimates that were published from time to time, did not appreciate the tremendous inroads that our American friends had made in their own forest resources and consequent invasion of lumbermen from south of the 49th parallel. Estimates based on unfounded assumptions have been made; some based on the supposition that forests containing timber of excellent quality extended into the far north, although there was abundant evidence that long before the limit of tree growth was reached, the trees were short, thick and sparse; that through the extensive belt in the north, there were but few trees of value, viz.: the spruce and tamarack; traveller's tales respecting trees seen in the valleys, in river deltas and other exceptionally favourable localities were put forward as typical of the whole region, though it is well established that with trees, as with grain, altitude is a more important factor than latitude.

It has been estimated that in the United States, *exclusive* of the loss by fire the cut is  $3\frac{1}{2}$  times the yearly growth.

In Canada, we find that Prince Edward Island has no timber. In Nova Scotia a survey by Dr. Fernow showed that only about one-ninth was virgin forest, or only lightly culled, and one-fourth severely culled. In New Brunswick figures are not available but the province has suffered from many disastrous forest fires, notably the great Miramichi fire which in 1825, swept one-fifth of the total area of the province. In Quebec, all the pine lands are privately owned, though the province retains the title to extensive areas of pulpwood, particularly north of the height-of-land and on the north shore of the gulf of St. Lawrence but, on the other hand, much of the northern territory is only sparsely wooded. In Ontario, most of the portion of the province lying to the south of a line drawn from Renfrew to Parry Sound has been cut over or burnt, and, although the forest reserves include an area of nearly 20,000 square miles, the pine in them would only last from ten to twelve years at the present rate of cutting and the pine resources of the province are practically confined to the area lying to the east of the meridian of Sault Ste. Marie and south of the height-of-land; the area north and northeast of Lake Superior has been devastated by extensive fires and during the present summer an extensive area near Port Arthur has been fire-swept. The northwestern portion of Manitoba and northern and central Saskatchewan contain valuable spruce forests but destructive fires have recently destroyed much timber; in Alberta, the eastern slope of the Rockies and adjacent foothills and the northern portion of the province contain much valuable timber but here again, the fell destroyer, fire, has desolated large areas. In 1884 and 1885 I traversed the Rockies from the international boundary to the North Saskatchewan and from the foothills to the Columbia. At that time—with the exception of the vicinity of the Bow and the Kicking Horse valleys, where the railway was under construction and man was apparently endeavouring to destroy the timber—practically the whole of this area was wooded with a virgin forest of pine, Douglas fir, spruce, &c., since then sacrificed to man's carelessness and human greed. In British Columbia, we find particularly on the western slopes, a magnificent forest growth but here, again fire has worked incalculable damage. After making all deductions, Dr. Fernow

estimates the area in British Columbia containing merchantable timber at 12 per cent, or say 30,000,000 acres or, if a lower standard prevails, possibly 50,000,000 acres.

The great enemies of the forest are fires and wasteful lumbering. Where traversed by railways, locomotives set more fires than any other agency; elsewhere that dubious distinction must be awarded to the tourist and prospector.

In 1908, the New York Central and other lines operating through the Adirondack forest preserve were ordered to show cause why they should not operate either oil-burning or electric engines on trains through the preserve. The railway companies proposed a number of remedies, including:—

- (1) Improvements in coal-burning engines.
- (2) Cleaning right-of-way.
- (3) Patrolling.
- (4) Telephone system.
- (5) Fire trains.

These proposed remedies were rejected by the Public Service Commission because:—

- (1) Improvements in coal-burning engines are not sufficiently radical to meet the conditions.
- (2) They were too complex and required too continuous and effective supervision to be thoroughly satisfactory.

The expense of electrical operation was shown to be prohibitive and that, under existing conditions, no fuel other than oil is satisfactory. The commission ordered the railways operating through the preserve to use oil-burning engines between 8 a.m. and 8 p.m. from April 5 to November 1, the oil-burning period to be shortened by the commission in years of minimum fire risk; coal-burning engines to be permitted between 8 p.m. and 8 a.m. with provision for inspection of stacks and grates.

In 1908, Commissioner Whipple stated that a careful survey showed upwards of 400 fires started in the forest preserve on or immediately adjacent to the right-of-way, 90 per cent of which were set by the engine. It was shown that the only Adirondack railway that has been free from fire was the Raquette Lake railway, which burned oil in summer. The only fire ever caused by this line was started by a coal-burning engine hauling a special train and which was used in defiance of the law.

I had occasion to go to the northern part of New York State and I have made inquiries as to whether it has had any effect and my information is that there are practically no fires at all this year throughout the Adirondacks.

I specially quote the experience of the Adirondack forest preserve as showing conclusively the large proportion of fires that is set by railways.

In Ontario two years ago we had a very dry season and I rode on a train on a newly opened railway and I would venture to say that our engine set at least half a dozen fires in the few miles we traversed.

Fires do not start in the forests of Germany, although railways run through them, principally because they are free from combustible refuse. In Canada, owing to the cost of oil-fuel, forcing the railways to use it would be flagrant injustice but it is not too much to demand that they clear the right-of-way and keep it clear; that during the

fire season, they patrol their tracks, following the trains, particularly where the heavy grades necessitate the maximum draught, and that they should make at the end of each division, rigid inspection of the grates and stack screens. In dry weather an engine with a defective grate or screen will set scores of fires per mile.

#### FISHERIES AND GAME.

Canada's fisheries are one of the most important in the world and the most varied in their products. The waters of the Atlantic and Pacific coasts teem with valuable food fishes; the salmon of the Fraser and other streams of British Columbia have a world wide reputation, and the great inland lakes have long supported an important industry.

In quoting statistics, however, it is usual to quote values and not weights although the latter is the only method of comparison that would indicate the depletion, or the reverse, of our fisheries. Thus, the value of the yield of 1881 was nearly \$16,000,000 and, in 1908, nearly \$25,500,000; but these figures do not disclose the fact that our oyster fisheries have decreased from 189,127 barrels in 1881, to 35,027 in 1908—less than one-fifth; nor do they indicate that the lobster industry has decreased from 7,140 tons canned in 1891 to 5,455 in 1908, and from 17,518 tons in shell in 1898 to 49 tons in 1908; that is, in ten years, the product has decreased from 24,000 tons to 5,500, or a little over one-fifth. In Ontario, the catch of whitefish—our most valuable of fresh-water fish—is only one-half of what it was in 1873. The average catch, during the years 1906-9, of the Fraser River sockeye salmon has decreased from 375,000 cases—the average 1901-5—to 221,000. Mr. Bowser, Commissioner of Fisheries, attributes the decrease to the greater efficiency of the apparatus used by the Americans, to the fact that their weekly closing period is six hours shorter than ours and that, when convicted, the fines imposed are much less than the value of the illicit catch. He also says that 'the industry will be destroyed unless the fish are given the same protection in American waters as in ours.

The most important of our fisheries are either in the high seas or are in international waters such as the Great Lakes. In the latter, each state bordering thereon has jurisdiction from its shores to the boundary line. Conflicting legislation and legislation not thoroughly enforced results in rendering the regulations ineffective and the fishery regulations of these and all boundary waters are now in the hands of an international commission and it is hoped that much good will result.

So far as the oyster fisheries are concerned, oyster culture should be encouraged and developed but it must be preceded by a final decision respecting the title to the foreshore—whether it is vested in the Dominion or in the provinces.

As for the valuable right or whalebone whale, it is nearly extinct; the Dundee whalers who formerly resorted to Davis strait and Baffin bay have practically abandoned it as unprofitable; one schooner still hunts in Hudson bay but would, probably, withdraw but for the profitable trade in furs with the Eskimo; some vessels still resort to the mouth of the Mackenzie river but, if not prevented by international agreement, this great mammal will, in a few years have gone the way of the great auk and the dodo.

It is necessary to lay stress upon the disappearance of game and the fur-bearing animals. The wild pigeon that formerly migrated in countless numbers, is extinct

and prizes aggregating \$3,500 for a nest are still awaiting a claimant. Anyone who crossed the prairies twenty-five years ago saw every lake and slough black with wild fowl of every description; to-day, remnants of the former flocks are seen occasionally.

The greatly increased demand for furs—part of the 'high cost of living'—has been followed by previously unheard-of prices and has stimulated the trapper and hunter. In the Yukon, about five years ago, a disease attacked the rabbits and nearly annihilated them. As a result, nearly all the animals that fed on them died from starvation and Mr. Congdon, M.P., strongly advocates setting apart fur reserves to permit these animals to increase. In Algonquin Park, Ontario, protection has resulted in such great increase of beaver that the government has had to order the killing of 500 and it is anticipated that they will be able to obtain a considerable revenue from the annual trapping of these and other fur-bearing animals.

In addition I might say that in Prince Edward Island a number of people have gone in for fox ranches as they call them, which have proved very profitable.

#### LANDS.

In 1909 we grew on thirty million acres, field crops valued at five hundred and thirty-three million dollars. Our exports of agricultural products aggregated 51 per cent of the total exports—more than the exports of the fisheries which were 5 per cent, manufactures 12 per cent, mining 15 per cent, and lumber 16 per cent. Our average crop of wheat last year was  $21\frac{1}{2}$  bushels to the acre, as compared with  $15\frac{1}{4}$  in the United States, 8 in Russia, 29 in Germany,  $33\frac{1}{2}$  in England, and 41 in Scotland. That our average in Canada is so high is undoubtedly due, in part, to the fact that we are each year bringing virgin territory under crop.

The agricultural resources form the greatest asset possessed by the people of Canada. With such an enormous area of arable land as we possess in our western prairies, and which only needs to be tickled by the plough to yield abundant harvests, there is a tremendous temptation to become surface miners of the soil instead of conserving the fertility and substance of the soil while obtaining the maximum crop.

The productivity of the soil is diminished by:—

- (1) Continuous cropping, which can be counteracted by rotation of crops, growing roots and leguminous crops (such as clover) or grass alternately with cereals, use of fertilizers and selection of seed.

- (2) Erosion, including washing away and leaching of the soil due to improper cultivation and selection of crops.

- (3) The ravages of insect pests and sometimes, of mammals. This damage can be eliminated or reduced by the application of modern scientific methods. The principal elements required by crops are:—

- (1) Nitrogen obtained by plants from the soil and from the air. As bacteria on the roots of clover, alfalfa, &c., abstract nitrogen from the air, they thus prepare it for use by other crops. In the average good soil in Canada there is nitrogen sufficient for 150 crops such as wheat.

- (2) Phosphorus, sufficient for 250 crops.

- (3) Potassium, sufficient for 300 crops.

Were it not that only a small portion of each constituent is available at one time, they would be washed out by rain.

That, during the winter months, our lands are fast in the grip of the frost king is an advantage and not a detriment, inasmuch as there is then no wastage. Nitrogen can be renewed by manure and by growing legumes; potash, by manure, and phosphorus should be renewed by the addition of superphosphate.

The use of selected seed is of primary importance. If selected seed had been used throughout Canada in 1909, it would have increased the crop of wheat, oats and barley by one hundred and ninety million bushels.

As a result of intensive cultivation, a Hungarian estate may be cited; in 1860, the yield was 11· (10·9) bushels to the acre; in 1900, it was 30·3 bushels—nearly three times the yield in 1860.

#### WATER AND WATER-POWERS.

Water is an all-essential resource upon which the habitability of our country depends. Its sole source is rainfall (including snow). Of the total precipitation, one half, called for convenience the 'fly-off,' is evaporated, one-third—the 'run-off'—flows into the sea and the remaining sixth—the 'cut-off'—is consumed or absorbed. The 'fly-off' is beyond human control; is a climatic influence and thus affects agriculture. The run-off is available for navigation, irrigation, water-power and water-supply and is, to a certain extent, controlled by man. The 'cut-off' passes into the ground and is either absorbed by plant life or passes through subterranean strata to the ocean.

Canada is bountifully supplied with navigable streams and lakes and, particularly in the initial stages of development of transportation, it is difficult to over-estimate their importance. In the initial stage, the canoe; in the second, the steam-boat, in the third, the railways.

On the other hand, as other means of transportation, particularly railways, are developed, many of these streams must, so far as navigation is concerned, pass into what Mr. Cleveland has called 'innocuous desuetude' though large bodies of water like the Great Lakes, which can be navigated at full speed, will, like the ocean, permit successful competition with the railways.

So far as irrigation is concerned, I need not discuss it further than to say that, in arid and semi-arid districts, next to domestic water-supply, it is of paramount importance. It is only necessary to mention the development in this district, in the Okanagan, and in the Columbia and other valleys, the Canadian Pacific irrigation block and the Alberta railway blocks and other irrigation projects in Macleod, Lethbridge, and other districts. Personally, I look upon the Alberta enterprises as the most important in the agricultural development of the province.

Canada is bountifully supplied with water-powers. In the eastern two-thirds of the Dominion, we have a belt of stratified rocks surrounding the 'U'-shaped Archæan nucleus. This nucleus, regarded in the large, is a plateau containing many rock-basins and descending by a series of steps to the lower levels which are underlain by the newer rocks. These rock-basins form the numerous lakes that so plentifully dot this area and the streams descending the steps furnish numerous valuable power sites. The possible water-powers of the Dominion have been roughly estimated at seventeen

million horse-power and the developed powers aggregate upwards of one-half million horse-power. Insignificant as the latter is, compared with the total possible, it is equivalent to eleven and one-half million tons of coal—one and one-half times the coal used in the province of Ontario and 60 per cent of the coal consumption of the whole of Canada.

In British Columbia, there are extensive plants, constructed or under construction, on the coast where an abundant rainfall throughout the year gives the desired regularity of flow, while the Bonnington Falls plant supplies light and power to the boundary mining district. There are extensive plants in eastern Manitoba and in Ontario, notably those at the famous cataract of Niagara, in Quebec, and in the maritime provinces. Very little has been done towards conserving the water supply to lessen the floods and increase the low water flow except on the Ottawa where conservation dams on lakes Timiskaming, Kipawa and Quinze will impound 6,000 square mile-feet. They will double the low-water flow at Ottawa city where the discharge has varied from a maximum of 250,000 cubic feet per second in 1876, to an extreme low of 15,000 cubic feet per second in 1905. In Alberta and Saskatchewan, all waters are vested in the Crown and can only be taken and used for irrigation by license. The province of Ontario has adopted a progressive policy respecting water-powers. All water-powers having a natural capacity at the low-water stage, of more than 150 horse-power can only be leased, the leases providing for an annual rental, for speedy development and control of rates by the Lieut.-Governor in Council, the Hydro-Electric Commission being charged with the administration of these leases. I might say that although these policies were only adopted a few years ago the province of Ontario receives \$100,000 per annum from these water-falls.

A review of the waterfalls of Canada would not be complete without reference to the Long Sault. To put it briefly, a number of capitalists who applied for a charter proposing to turn the St. Lawrence into power proposed to generate 360,000 horse-power and that is more than the total horse-power that is being generated in the whole of Canada to-day from the Atlantic to the Pacific. This company, prior to applying for a charter, bought out the American Power Company, at a cost of \$75,000 and they proposed to sell that power in Canada for \$15 per horse-power. They find there is no market for the present development. The question naturally arises what the company proposed to do with the water power had they got it. The thing is to look to the future. At the present time the longest transmission is from the St. Lawrence to Syracuse, 166 miles. If it were possible to transmit power 350 miles the owner of Long Sault would be able to sell power in New York and Albany and all the cities of the State. In addition to that it has been estimated that the coal of the United States will only last one hundred years and in time that we must fall back on the waterfalls in Eastern Canada; at any rate we must depend on water power for our light and power.

Control of freshet water is of vital importance; conserving it in reservoirs, natural or artificial, increases the low water stage—the practical measure of the utility of a stream; it also reduces soil erosion and flooding of the lower lands.

The rainfall, not evaporated, passes into the soil and forms a great reservoir of ground-water. From this store, forests and all other crops draw their moisture; it is the basis of all agriculture and from it through wells and springs, is drawn the

water supply of four-fifths of the population and nearly all domestic animals. In the eastern United States, the average water table has been lowered 10 to 40 feet by deforestation and injudicious farming. The same effects have followed in portions of Ontario where streams have run dry and wells have had to be deepened.

#### PUBLIC HEALTH.

National vitality is the measure of the efficiency of a nation and depends on the vitality of the individual and on his physical and social environment. The length of life in Sweden is over fifty years, in England and the United States about 45, in India less than 25. In England in the last 50 years, the length of life has increased about 5 years; in Prussia, in the last twenty-five years, it has increased over six years, in Geneva, the records show the following life span:—

16th century.. . . . .	21	(21.2)
17th " . . . . .	25½	(25.7)
18th " . . . . .	33½	(33.6)
19th " (1801-1883).. . . . .	40	(39.7)

showing an increase of 100 per cent in three centuries. In 1693, the British Government sold annuities and made a profit. A century later (1790) it repeated the operation using the 1693 rates as a basis, and sustained a heavy loss owing to the increased longevity. In Canada, the death rate was 15.11 per 1,000 in the last census year, in France it is 20 and in India, 42. In the provinces of the Dominion, it ranged from 9.78 in British Columbia to 18.54 in Quebec. Basing the estimate on the British figures there are at the present time, 250,000 people in Canada suffering from serious illness of whom 42,000 are consumptives. Probably more than half this illness is preventable. Our annual mortality from tuberculosis is about 13,200, from other diseases commonly known as preventable, 26,000 and from other diseases now being recognized as preventable, 36,000.

Assuming that three-fourths of the mortality from tuberculosis and other preventable diseases can be stopped, it has been estimated that it would increase our average length of life over fifteen years. Assuming, also the value of each life lost at \$1,700 and the average wage loss per invalid at \$700 per annum, the economic gain to Canada would be \$140,000,000 a year.

As an instance of the beneficial effects of municipal control of contagious diseases, the experience of England may be cited. There, the mortality of infants between one and five years has decreased 40 per cent since 1860 and, in Ontario with an increasing population, the deaths from acute contagious diseases, fell from 4,670 in 1882 to 1,768 in 1902; in 1881, there were 4,541 deaths from diptheria, in 1901, with 33 per cent more population, there were only 1,982. Statistics show that the infants in German cities die of diarrhoeal diseases, nearly all of which are due to the bacteria of fermented milk. If the information were complete, a similar statement could be made concerning the great cities of this continent.

Typhoid is a filth disease due to infection, usually through the milk or water supply or from the unspeakable fly. With proper care, typhoid would, in a few years, be as rare as small-pox. The epidemic of Ottawa in 1888, of Winnipeg in 1906 and

Montreal in 1910 emphasize the absolute necessity of a pure water supply and, still more important, a pure milk supply.

More than 10 per cent of the mortality is due to tuberculosis. If every one will learn the important facts about it and the means for its prevention, the third generation will be free from it.

#### FIRE LOSSES.

The greatest waste of structural materials is that due to fire losses, and European experience shows that they can be greatly reduced by using fire-resisting materials. The actual loss includes not only the property destroyed but also the maintenance of fire departments, excess of insurance premiums over benefits returned, additional cost of water used in fighting fires, &c.

Figures for the actual annual fire loss in Canada are not available but, if assumed to be proportional to the losses in the United States, they would aggregate about \$35,000,000.

These losses can be reduced by:—

- (1) The use of fire-resisting materials such as concrete, brick, stone, &c.
- (2) Encouraging the use of these materials by disseminating information respecting the strength and durability of these materials and where they are obtainable.
- (3) By the enforcement of building laws that will ensure fire-proof or fire-resisting construction.

I have given you a hasty and somewhat disjointed review of our resources and the principal measures that should be taken for their conservation. In regarding our resources we are too prone to regard them as ours and to be content if they suffice for our own needs, utterly ignoring the other and correct view that we are trustees and trustees only—trustees for our children; for our children's children and all succeeding generations. And as we administer our trust so shall we be judged. If administered well we shall have a great heritage, a glorious heritage, but if administered in the *laissez faire* fashion that has hitherto obtained on this continent, then are we unworthy servants—unworthy of the trust that has been confided to us.

The CHAIRMAN.—We have just listened to a very interesting paper on a very interesting subject and I think I may take it on behalf of the convention to thank Mr. White for this paper he has just read to us.

We have now an address by Mr. Martin Burrell, M.P. Before calling on Mr. Burrell, I am going to ask Hon. Duncan Marshall, Minister of Agriculture for Alberta, to shortly address the meeting. He has been good enough to come from our sister province to attend the convention here and I for one, and I think the convention as a whole, would be only too glad if Hon. Mr. Marshall would be kind enough to give us a short address.



## HON. DUNCAN MARSHALL.

The Chairman then introduced Hon. Mr. Marshall, who said:—

Mr. Chairman, ladies and gentlemen.—I assure you that I am pleased indeed to have this opportunity to look into the faces of the members of this convention. I am particularly pleased at one remark the Chairman made, and that was that my address was to be short. I am glad of that as it lets me out, as I would not be able to make any other than a short one.

I am glad to come over here as this is an interprovincial convention which will do something to promote that neighbourly feeling that is in the hearts and minds not only of my own province but of this province of British Columbia as well. I think it will make for the commercial wealth and commercial progress of both these provinces for their citizens to get better acquainted. I am in rather an unfortunate position through having come from the best province in Canada to visit the best province in Canada. I will have some difficulty if I attempt to say much either about the province from which I come or the province I am visiting. In attempting to make remarks of that kind I would be in a position of trying to serve two masters and I know a man who tried to serve two masters and he is serving a sentence for bigamy now. I notice, Mr. Chairman, that when the premier was speaking this afternoon he said something about several localities in this province being the best localities. That is not true about the province from which I come. Every farmer believes he is operating the best 160 acres in Alberta, and the feeling seems to be the same in this province and I would like to say that that splendid optimism that is in the hearts and minds of these western provinces, where every one believes his is the best locality, is one of the things that make for the development and building up of these splendid western provinces of Canada, and I hope that optimism or satisfaction will continue to assert itself in the hearts and minds of the people and we need have no fears of the result of the development of the country. I have no thought or intention of saying anything on the practical side of irrigation. What farming I have done in Ontario and what I am doing in this province is so located that nature attends to that matter for me and I have had no direct connection with farming through irrigation, but it has struck me this afternoon how good were the holding of irrigation conventions and it struck me that the gathering together of different delegates from different districts to discuss irrigation problems in the irrigation portions not only of this province of British Columbia but in my own province from which I come, was a good thing. In Alberta the Dominion government has charge of the irrigation work, and being a somewhat peaceful man, when I heard the discussion about being handy with the shot gun or rifle, I was satisfied that the Dominion government and not the provincial government had the management of that, as I am a lot better on the sprint than I am with a shot gun.

Irrigation has been carried on to some considerable extent in Alberta. I believe as a result of lack of rain in some parts of the province it will be carried on to a greater extent. For the last three or four years the rain-fall has been such that they did not require irrigation and consequently where they had ditches prepared they had



White Valley Irrigation and Power Co., Ltd., Vernon, B.C. View of interior of flume before tarring.

allowed them to fill up and let them go by the board and this year some of the localities that might have had a better crop than they have, did not have as good as they should have on account of lack of irrigation. They were something like the little boy who said his father was a Presbyterian but he was not working at it now. We have splendid experience in Alberta this year of what water can do for land in the dry belt of the province and I believe with the progress of irrigation schemes that are now being effected and will be worked out in the next few months that irrigation will be well provided for, and although the provincial government has not got control of water or irrigation I would say that as far as I am concerned as the Minister of Agriculture of that province my department will be glad to assist and promote all they can in irrigation, or the cultivation under irrigation of the crops in our province.

Now, Mr. Chairman, ladies and gentlemen: It seems to me I have made at least what was designated as a short speech. Let me say that I recognize the importance of irrigation in this country on account of its bearing on agriculture, and your premier went so far as to say that notwithstanding your great minerals, your timber and your fisheries in this province that your agriculture, or at least your fruit wealth, would be looked upon as the greatest, and in Alberta as to the agriculture being the greatest is not questioned by any one, and anything that affects that industry regarding the development of it by bringing of water to prepare the land, is of importance to the province and I am glad to say, as an agricultural man, the lure of the land seems to be upon the people and everybody in our province is trying to get a piece of land no matter if it is only a few acres. The men who left the farm thirty years ago to go into business and professional life are going back to the land, and speaking of agriculture, it is the agricultural districts that present the men to cities like New York and London and keep them alive. They would be rotten if it were not for the good red blood that is sent into them from the agricultural districts of the country. The men standing at the head of big corporations and businesses to-day are the men who were brought up on the farm and there got their first essential, that is their ability to stand good hard work. I am glad to come here to-day to listen to the deliberations of the association and to render any support that I can give to a convention of this kind, as it has the object of carrying through irrigation to districts that would otherwise be barren and instead we find fields of oats and wheat. Thanking you for your kind and indulgent hearing, I bid you good-night.

The CHAIRMAN.—It gave me much pleasure to invite Mr. Marshall to come up and address us, largely because it shows that our sister province of Alberta and the government of Alberta is taking an interest in this work, but the pleasure has been greatly added to since I had the pleasure of listening to Mr. Marshall and I think you will all agree with me in saying that we will hope to hear him soon again.

#### MR. MARTIN BURRELL, M.P.

The Chairman then introduced Mr. Martin Burrell, M.P., who said:—

Mr. Chairman, ladies and gentlemen,—I am positive that I owe this audience an apology for appearing on this platform at all. I might say in the first place I am personally very glad to be here, as I was two years ago in Vernon, as we are all prac-

tically interested in different agricultural lines and therefore in irrigation methods. All who have studied the matter of irrigation, or those of us who have given close personal investigation to the matter, know the great importance of this subject of irrigation. You sometimes hear disparaging remarks on the subject—that irrigated fruit is no good, there is no flavour, &c. I am afraid, Mr. Chairman, these remarks come from real estate agents who have large tracts of lands and have not any contracts of water, and let me say that in the Okanagan, particularly where I work, statements of that kind in a country such as this, are misleading. I do not know the exact rainfall in your district. I know that before I came back from the east I heard we had a very dry season and I could tell that from the conditions on my return. In June we had about  $1\frac{1}{2}$  inches in our district and in July practically none, in spite of these conditions we had this year a very early growth, and notwithstanding these conditions we were able to get a good growth on some of our old trees and on the young ones. I think you will bear me out in this statement that under the very dry conditions that we find here, many of our orchards of newly set-out trees somewhere about two years, have a moisture at from 2 to  $2\frac{1}{2}$  inches, but when it comes to older trees we find the soil dry from 3 to  $3\frac{1}{2}$ , and when we get to ten and ten and a half years we find frequently 5 inches of dryness under the soil. You have to bear in mind the older the tree the greater the drain on the moisture, and therefore a statement of this kind is misleading.

I have heard the statement made that orchards will do well, and it is safe for people to invest in fruit grounds in parts of the country without irrigation, but when you take into consideration that 10 per cent of the fruit is water and when you also consider that you get ten or twelve cases to the tree—lots of orchards are doing it—at twelve or fourteen years of age, you would have in that case about ten tons of water taken out by the fruit alone. But that is a small thing, you have the very necessary matter of bringing up the standard of a tree. You must remember these statements have all to be considered according to the age of the tree. I would also like to point out one other thing, that while you may sometimes get a good growth in your orchards in the dry season, there are other times when it calls for water. The best answer to those gentlemen who are inclined to underrate the use of irrigation is to point out the great irrigation work in the Ganges country where you have from 50 to 60 inches precipitation in a year and yet you have in those countries irrigation works where they are irrigating 600 acres with 135 miles of main canal, besides distributing provisions, and in China and Japan we have the same thing. We have the same in Italy and France, where the rainfall is far heavier than in this part of the country, and then we come to the dry belt of this country. Wilson's estimate is that there is from forty to sixty million acres in the world to-day under irrigation, where it has been found that the application of artificial water is absolutely necessary to produce any crop at all, or that by using water you can produce a more abundant crop. I am perfectly aware that a lot of my remarks would be A B C to the majority of the people in the room, but there may be a stranger here, and let me say that in determining the productiveness or unproductiveness of agriculture it is not so much the rainfall in any particular district as its distribution, and it is estimated that this lack of necessary and regular rainfall during the growing season when the crops demand it makes irrigation practically an indispensable thing throughout the interior of British Columbia.

No one will be likely to overestimate the immense value of conserving the moisture that is in the soil before water is artificially applied, and as this is a subject that is sometimes not touched on I may be pardoned a passing remark. I might say that I find throughout the country that the men who are thorough irrigators, who have given a careful study to irrigation, always use it most carefully and sparingly in agriculture, but you will also find men who from the fact of their having an abundance of water carelessly use it, not looking to the time when it is going to be certainly necessary to every one of us in this province to conserve every drop we can and stop the waste going on. I think it safe to say there is a great waste of water going on all the time, especially during the early months when thousands of people ought to be getting the water on their ground, and we have the water that is going off in evaporation every day. King has estimated that on a very fine day from 2 to 4 pounds of moisture per square foot will go off the ground in a single day. That represents from 40 to 80 tons of water per acre; when you realize that an acre-inch amounts to 113 tons, and that that therefore means at least half an inch—and there are those of us who realize what good every bit of rain does, even half an inch, when we need it—you can easily see the sense of jumping in in the early spring and preparing the land and saving by a little energy what you are praying for six or eight weeks later in the season. Now we find that evaporation goes on far more rapidly when the soil surface is wet rather than dry and this should point out that we should get on the land as early as possible in spring, and not only that, but we should cultivate as early as possible after finishing our irrigating. There are any number of people in this province who after they have got through watering through the open furrows, allow those to remain open day after day and possibly half goes off in evaporation and these things have to be borne in mind. If the soil in British Columbia is to give quick results, the man should jump on the ground early and cultivate it quickly after he gets through watering. Leaving this let me say there is no need therefore, especially in a convention of this kind, to re-emphasize the importance of irrigation and of our irrigation problems, I do not think it too much to say that on the successful solution of our irrigation problems depends the ultimate development and prosperity of the great interior of British Columbia.

This convention or association, Mr. Chairman, is an interprovincial one. We as British Columbia members are certainly delighted to see this year so many from the prairie provinces and from the other side of the line. Of course our problems are somewhat different from those of Alberta. I presume I am right in stating that in Alberta possibly 99 per cent of their irrigation problems have to deal with agriculture, and that 90 per cent of our irrigation problems have to do with horticulture and the chief necessity with us is the making the supply of water go as far as possible, that is the proper and intelligent application of water, and next, the control, the duty and the application of water. The one is practical and the other is perhaps more legal. In 1908 we had an excellent convention at Vernon when the legal aspect assumed a very large proportion. I want to touch for a moment or two on the practical side, that is the duty of water and the application and methods of its distribution. I am looking forward with immense pleasure to the lecture we are going to have to-morrow night from Professor Etcheverry, as I think a lecture of that kind is a lesson we very sorely needed in our last convention and I am sure it will be greatly appreciated by every one of us in this convention.

The question of how much we ought to apply is a matter that needs more studying out, that is how far you should spread a given quantity of water over a given quantity of land. This depends, first, on the character of the crop, and secondly, of the character of the soil, and then it must also depend as well on the methods that are used and the character of the weather. I want to refer to one or two things on which a great difference of opinion has existed. Some of us who have had two or three years have been able to get a fair idea of the growth. I know a great many of the berries depend on the supply of water. Conditions vary all over the world, from the water methods of Italy, where 1 cubic foot will be enough for one acre and a half, up to 400 acres in the California section. We are largely interested in fruit—I am not speaking now of berries as they take a great deal more water than trees, but with trees, the roots of the trees are so much larger and wider that if you apply the water farther away from the trunk of the tree then you give the tree the most benefit. Some claim that the miner's inch, referred to by Mr. Fulton this morning, should be allowed for one acre of land. I think that a miner's inch would do for three acres of land, and let us remember that one acre-foot, which is supposed to be a very fair amount of water during the growing season, that lasts for 90 days, equals a miner's inch per week for those 90 days, and in the district I live in, where we had  $1\frac{1}{2}$  inches in June, if we got 1 inch of rain every week for those 90 days, I think we would be living in a paradise. One acre-foot for 90 days, that is allowing 12 inches for 90 days, would serve 178 acres. Where there is no intelligent method of conserving the moisture after it has been applied, we will find the duties of water are great but by proper methods we will be able to irrigate more largely than we had any idea of and in a more satisfactory way.

I wish to mention that matters of this kind are of great interest to the beginner, and there are some of you who have come into this country knowing little, or practically nothing, of horticulture, and I hope all these practical details will be worked out so it will be possible for you to meet with satisfactory results, for otherwise the country cannot progress the way we oldtimers wish it to progress. In applying the water we have got to meet to some extent the problems involved, in different ways, and have to learn to adopt the principles to our own special conditions, and those conditions will vary so much in every particular district, that you cannot lay down a rule that will be applicable to any large tract of territory. We are all aiming at all events to save our water and to apply it in the most profitable and satisfactory way, and certainly the time is coming rapidly when every operation will have to be directed to the object of saving every drop of water in these large interior areas.

There is one other point—that is as to temperature. I have heard it said it is dangerous to apply very cold water from the stream and I might say that there are very few which, as mountain streams, will register lower than  $45^{\circ}$  or  $50^{\circ}$ . In my experience I find there are few that are lower than  $50^{\circ}$ . By the time you have got the water through the necessary channels and ditches to your own land you will have a rapidly rising temperature. I have found in my own case a difference of  $5^{\circ}$  between two flumes not very far apart and with a fall. Where the water is about at  $50^{\circ}$  you cannot lower the temperature of the soil to any very serious degree. Where it is spread over a large territory, you would fail to lower the temperature of that soil more than two to four degrees. Speaking in a general way, I would say there was no danger of lowering the temperature to any very serious extent.

I might add one or two words from the legislative standpoint. We are all thinking and puzzling over a great many of these things. It is quite obvious that the problem of supplying water will have to be one of the problems of the future in a great many parts of the province. I have referred to Vernon in 1908. You will remember the lot of valuable work that was done then, and I think we have to thank ourselves for the initial steps that were then taken by the government of British Columbia to bring order out of the chaotic condition then existing. Mr. McBride referred in a very sympathetic way to these problems. The government is anxious to help solve these problems and we have reason to be gratified in knowing that they have taken these steps by the Act that was introduced by Mr. Fulton. I have not followed it fully, but on the whole it is a strong effort in the right direction. I will say, however, and I am glad to say it now that Mr. Fulton and the premier are present, that that Act will not effect any good unless it is enforced along the most drastic lines, and that enforcement will not come without the whole-hearted co-operation of the whole people. We have also the appointment of a chief water commissioner. These are steps in the right direction. May I also say, as the problem has been presented to this convention, that the question of the future supply of water is bound up in the conservation of the country. Mr. White in his able paper on the conservation of our resources said that 51 per cent of our total assets were agricultural products, and when we add to that amount the amount connected with horticulture we have to recognize that the development along the path of the several agricultural lines is intimately bound up with the whole prosperity and the whole cultivation of the country. Therefore anything that develops successful agriculture must have very strong demands and impose certain obligations on those gentlemen who are forming governments of countries and have to deal with the legislation department of the country over which they are presiding. We have to look at any of the great irrigation systems of the world to find out that none of them would have been possible and none of them carried on without very large government co-operation and assistance. I need not refer to the large amount of irrigation work in India and Japan where government assistance plays a very large part, nor to the great irrigation system in Australia where government assistance is of a very strong and energetic character, to again point out that for the successful solution of these things we must have laws.

We have taken the initial step, but we will have to have a larger amount of government assistance than we are having at the present time. I know that these subjects are sometimes dangerous. Fortunately for me I have no personal responsibility. I am not a member of the provincial legislature and I am that fearful fellow of the opposition in the other place. There are some people who say that it is not part of the government's business to do what private people should undertake. I would be very sorry to see the government going to the extent of interfering with or deterring private enterprise. I think that the great success of the Anglo-Saxon race has been that there has always been a lot left to private enterprise. I think that none of us need fear that we are advocating anything socialistic by asking that the government shall if possible lend a hand in the development I have outlined. The whole subject comes down to this, that if you are to have government assistance in big schemes you can have it in one of two ways, either the way of government ownership and government supervision, or you have government assistance in the way of guaranteed

bonds. Either way you have it you would be having government assistance. Apart from legislation and apart from the present steps taken by the provincial government I am not in sympathy with those people who think that a government cannot undertake a new work and develop it as successfully as a private person can. They say that politics are such that it is impracticable. I would be very loath to think that. It is against human nature to think that we cannot reach that stage where the people can own and operate the public utilities for their own use. I am free to admit that large companies where they have government assistance do very satisfactory work. You must remember that these companies cannot afford to take the same risks as governments can.

I was pleased to listen to Mr. White's paper on that important subject 'Conservation of our Resources.' With the immense resources that we have and which are practically unused, it is possibly natural that we should have the tremendous waste that does go on in every district of this great country but the waste cannot go on if this country is to progress, and therefore every one of us is interested in the question, particularly in a convention of this kind that is laying itself out to find a solution of the difficulties that are bothering us in our own particular sections of British Columbia.

Let me say in conclusion that it is up to the people to make reasonable demands on the government. The government will give assistance but I do not blame governments for going somewhat slowly in the application of principles it does not know, and it behooves us in this question to go slowly, to make sure our demands are reasonable and to make sure that they are best and really justified and as sure as they are, I am sure that the government of British Columbia or whatever government may be in power will lend every assistance to seeing that the whole of the administration of this province is placed on safe and practical lines.

Let me thank you, Mr. Chairman, and the ladies and gentlemen for your kind attention to what I fear has been a very rambling talk.

The CHAIRMAN.—The local committee tried to get Prof. Campbell to address the convention but it was impossible for him to come. Mr. Burrell has spoken on the questions that Professor Campbell would have spoken on and I think we will all have less regret, now that we have had the pleasure of hearing Mr. Burrell.

I now call upon Mr. A. E. Meighen to read a paper.

#### MR. A. E. MEIGHEN.

Mr. Chairman, ladies and gentlemen,—This is simply a statement of the problems met with in the irrigation system and the methods adopted in overcoming them. Although we have used considerable concrete in the adoption of that system I have touched on that very little in view of the fact that we are to be favoured with a paper on that subject by Prof. Etcheverry, who is a recognized authority on that subject.

#### THE CONSTRUCTION OF A MODERN IRRIGATION SYSTEM IN THE THOMPSON VALLEY.

The system which I am about to describe is designed to serve 6,000 acres of land, the property of the British Columbia Fruitlands Ltd. The property lies along the west bank of the North Thompson and the north bank of the Thompson rivers. The



northern boundary is about twenty-one miles and the western boundary about five miles distant from Kamloops, about 3,000 acres being directly opposite the city.

The main source of water supply is Jamieson creek, about eighteen miles north from Kamloops, its location making necessary a north ditch about three miles in length to serve 500 acres, and a south ditch seventeen miles, in length to serve 5,500 acres.

Part of this property has been served for five years by a canal which for various reasons has not proved satisfactory, and it is the reconstruction of this old system that the Kamloops Fruitland Irrigation and Power Company, a sister company of the land company, has taken in hand.

I may say that this company has determined, in installing the new system, to make it of the most permanent and up-to-date nature possible.

Following out this idea their intention is to line all earth channels with 3 inches of concrete.

Before proceeding to describe the methods employed in applying the lining I will refer to some of the considerations which influenced us to adopt concrete lining.

In the first place although the average yearly flow of Jamieson creek is more than ample to serve the entire tract, being about 30,000 acre-feet, it is unevenly distributed over the irrigation season there being an insufficient natural flow during the latter part of July and August, and September for the requirements of the land. The available reservoir sites in the water sources where water can be stored at a reasonable cost are limited and every acre-foot of seepage loss in the canal that can be prevented represents a considerable saving in the capital expended in building dams. It appeared to us a great waste of money to construct expensive storage works, and lose our water through seepage in the main canal.

To a body of irrigationists it is not necessary to say anything about seepage losses. Every one who has had any experience with an earth ditch knows the tremendous loss that is constantly going on due to that cause. As to the efficiency of a concrete lining to prevent this loss I might refer to the Gage canal in Southern California, a system with which I am very familiar. Their main canal is twenty miles long. Before lining they lost 40 per cent of the water turned in at the head-gates; after lining 8 per cent. The lining used was  $\frac{3}{4}$ -inch cement plaster.

Moreover the loss of water is not the only factor to be considered in this connection. There is the injury to the lower lands lying along the line of the canal due to water-logging and the production of alkali on the ground surface. These conditions are apparent along any canal with earth channel that has been operated for any length of time. In my own observation I have seen many acres of orange groves ruined and abandoned from the above causes.

When it comes to the question of dollars and cents, while concrete lining is undoubtedly somewhat costly, the difference in the cost between a lined and unlined canal is not as great as would appear when the plans in the beginning anticipate lining. In a lined canal the water attains a much greater velocity than in an earthy channel of the same dimensions and slope and can safely be given a much higher velocity, consequently the required cross section is very much less and the excavation correspondingly less. To illustrate—on the first section of the Kamloops Fruitland Irrigation and Power Company's canal the bottom width of the channel is 5 feet; to



White Valley Irrigation and Power Co., Ltd., B.C. 36" wood siphon across B. X. Creek. Blow-off valve partly open.

obtain the same capacity a canal with earth channel would require a bottom width of 10 feet.

The method of lining is as follows:—

For the south ditch it was found advisable to use six and one-half miles of the old company's ditch. The bottom was dressed accurately to grade, the channel widened where necessary, being made 18 inches wider than the designed finished concrete channel which allowed for 6 inches of backfilling behind the lining on each side. The side slopes adopted were  $\frac{1}{2}$  on 1. Earth forms were then put in, the ditch being put in line with centre stakes which had already been placed in the bottom. The earth forms were made of 2-inch x 4-inch scantlings for the frames and shiplap for the sides; they were 6 feet in length and made perfectly rigid. Moist earth was shovelled in behind these forms, and thoroughly tamped, they were then removed and moved forward leaving the channel the exact shape of the designed cross-section only 3 inches larger all round. The concrete forms were then put in place; these were made similar to the earth forms only smaller and behind them the concrete was placed, using a very wet mixture. The floor and sides were put in at the same time. The concrete forms were also 6 feet in length, and the lining was put in in alternate sections. This was to provide for expansion joints; as soon as the first sections had sufficiently set the forms were removed, and a coating of hot asphalt applied to the edges and a layer of tar paper and then the alternative section were put in.

The old ditch line is abandoned six and one-half miles from the headgate and a new ditch is being excavated from this point. This was necessary for the reason that a fall was placed in the old ditch at this point to escape difficult construction, with the result that it did not command a considerable area of valuable land at the lower end.

The alignment of this section has been done with a good deal of care, the tangents and curves being run in with transit. In locating the line the grade contour has not been adhered to as closely as in unlined canals, the object being to shorten the line as much as possible, and to avoid sharp curves.

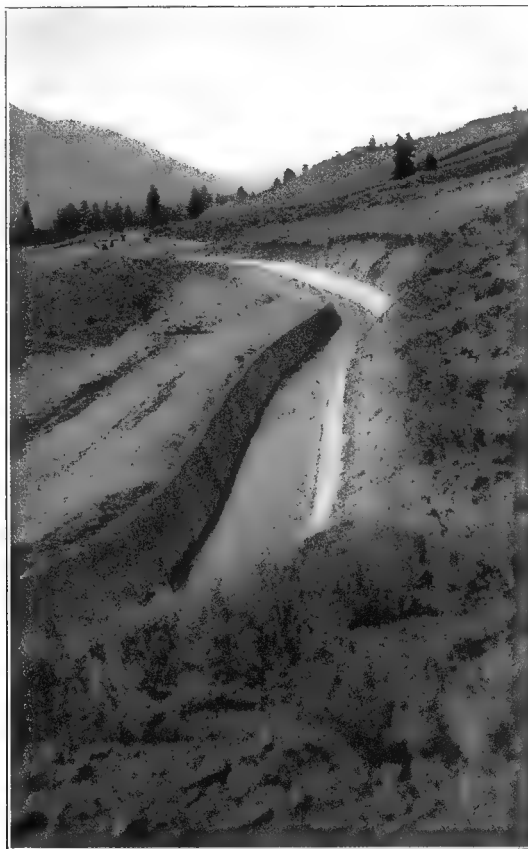
The excavation on this section is being made large enough to allow for 6 inches of backfilling which will be put in by sluicing.

Where the canal line crosses gulches and drainage channels, in cases where they are not large, concrete-lined fills will be put in with culverts through them to take care of the storm water. In other cases Maginis' steel flumes will be used in place of wooden flumes; after some experience with the latter we have come to the conclusion that owing to the conditions to which they are subjected a satisfactory wooden flume cannot be built in this country. The Maginis steel flume has proved very satisfactory wherever used, if sufficient care is taken in building the substructure so that there is no settlement.

At one point on the line where a rocky side-hill is encountered with rather an extensive rock-slide, an inverted syphon 4 feet in diameter and 3,700 feet long will be used. The upper end of this syphon, which will have no water in it for considerable periods, will be reinforced concrete, the balance continuous wood-stave pipe.

The entire main canal has been planned so that its capacity at any point is equal to 1 second-foot per 50 acres for the area served below that point. This quantity is sufficient to give, each month, a depth of water of 1 foot over the entire tract. This does not present the duty of water on the land; the large capacity was planned in order to make the most use of the creek when the flow was greatest.

To supplement the stream-flow, 2,000 acre-feet will be stored in the water sources and a pumping plant with capacity of 10 second-feet will be installed to pump water from the North Thompson river into the main canal. The pumping plant is made necessary on account of the low spring flow of Jamieson creek. In ordinary seasons there is a deficiency in natural flow till May 1, and at that time the stored water is not available.



Concrete lined canal, Kamloops Fruitland Irrigation and Power Co., British Columbia.

#### DISTRIBUTION.

In planning the distributing system as in the case of the main canal, the main considerations were permanency and economy of water. For these reasons the open ditch and flume system was abandoned and a system of cement pipe lines adopted. These pipe lines will follow along the property lines and water will be delivered to each lot at an elevation sufficient to command all the land, being controlled by valves and accurately measured by means of measuring boxes.

The subdivision of the land will be made to conform to the topography of the land, thus permitting the most effective and economical planning of the pipe lines and at the same time rendering more simple the irrigation of each lot.

All the pipe and the necessary regulating and measuring boxes will be made on the grounds, the necessary material with the exception of cement being available all along the line.

In conclusion I will simply say that when it is complete we expect to have a system with the minimum of loss of water and the maximum of permanency, and to be in a position to deliver water, at the time, in the place and in the quantity desired by the company or by individual lot owners.

The CHAIRMAN.—Mr. Meighen's paper is very interesting, and will add possibly to the interest with which we are looking forward to Prof. Etcheverry's two papers to-morrow. I think the convention has done a full day's work and will probably be quite willing and glad to adjourn. The convention to-morrow opens at 10 o'clock and we expect to have a very interesting programme before us.

Mr. PALMER.—I wish to move a very hearty vote of thanks to the different speakers this evening.

Mr. HALL.—I second the motion.

Motion carried unanimously.

#### MORNING SESSION.—THURSDAY, AUGUST 4, 1910

The CHAIRMAN.—I am informed that the credential committee would like any one who has not yet presented his certificate to do so soon as possible. I am also asked to announce that the Kamloops club has put up all the delegates there.

The resolution committee reported the passing of eight resolutions which they have printed and handed to the members of the convention. They also asked to have it announced from the chair that the time of receiving any further resolutions should be limited to this session.

The CHAIRMAN.—You have heard the report of the resolution committee. Eight resolutions have been dealt with and presented to the convention. What is the pleasure of the meeting with regard to the programme? The first item is an address by Mr. F. H. Newell of Washington. Mr. Newell has been unable to get here and it is proposed to have the paper by Mr. Ashcroft which he was to give this afternoon.

It will be in order to move that the resolutions be received and the discussion proceeded with after Mr. Ashcroft's paper.

Above resolution, moved by Mr. Ashcroft and seconded by Mr. Carruthers, was unanimously carried.

Mr. HALL.—I have been asked to announce that the delegates going east to-morrow night will kindly give their names to Mr. Pearce. Arrangements will be made to have a private special car if possible put on, or at least we will endeavour to have an extra special car attached to that train.

The Chairman then introduced Mr. Ashcroft, who read the following paper:—

## MR. A. E. ASHCROFT, C.E.

Mr. Chairman and gentlemen of this convention,—‘Of the making of books there is no end.’ So wrote the sacred writer 2,900 years ago and in irrigation matters, as in other departments of human endeavour, this is true. On the clay tablets of Babylon 4,000 years ago were engraved rules regarding the use of water in irrigation; and to-day, books, bulletins and magazine articles are pouring forth in an endless stream dealing with the same subject. When I was requested by your committee to prepare a paper it seemed to me that there could be nothing that I could write from my small stock of experience that would be either new or interesting. On further consideration I came to the conclusion that if I could succeed in presenting but one fact or expressing but one idea that was new or informing to but a percentage of my audience, then would this paper, and my presence on this platform, be justified.

I have listened with deep interest to the addresses and discussions at this meeting. One word of protest I must put in, however, at the too frequent reference to ‘shooting,’ ‘shotguns,’ and ‘rifles,’ in connection with disputed water rights. Sir, this is Canada and methods of violence and lawlessness have no place here, and neither has talk of violence and lawlessness a place in this convention. We are pioneers to

‘Drive the road, and bridge the ford,  
‘And let each man have his own  
‘And reap what he has sown.  
‘And dwell in peace and plenty to the glory of the Lord.’

## IRRIGATION IN THE OKANAGAN AND THOMPSON VALLEYS, BRITISH COLUMBIA.

On the Nile, in India, in Mexico, and in the western States of the Union are works built of enduring masonry, the highest examples of engineering skill, for the same purpose as the crude ditch and flume of the early settler in the interior of British Columbia; the difference is in degree, not in kind. There is no sight so arresting as the contrast afforded by the vivid green of a field of alfalfa surrounded by the desolate looking sage and cactus characteristic of the ‘dry belt’ of this province.

The district embraced in the valleys of the Okanagan and Thompson with their tributaries contains 500,000 acres of lands, that, with irrigation, will produce fruit and other crops which are as much more valuable than wheat, as wheat is more valuable than native grasses. It is no exaggeration to say that 10 acres of good irrigated fruit land is equal in producing value to 160 acres of the best wheat land in the Northwest. These valleys are capable of supporting in comfort and even luxury 50,000 families or a quarter of a million souls, who would be living in ideal conditions, under a perfect climate, with facilities of intercommunication, graded schools, clubhouses, lecture rooms, &c., &c. In short all the material advantages of the city added to the immeasurably greater advantages of the country life. I make the assertion without fear of contradiction, that a population so settled are a greater asset to a nation than twice their number congested in a large city.

## DEVELOPMENT.

A respectable beginning has been made in reclaiming and settling this vast area, some 100,000 acres being covered by the various systems already constructed or in course of construction. So far this has been done by private enterprise. The provincial government, alive to the importance of the development taking place, has done much by revising the water legislation, reserving the watersheds, protecting the forests from destruction by fire, instituting a hydrographic survey for the purpose of making an inventory of our resources in water supply, storage basins, &c. The question of how far a government should go in this direction and how much of the development of the country should be left to private enterprise is not up for discussion in this paper. A very important and far-reaching step has been taken by the municipality of Summerland in acquiring and administering the irrigation system for all the land within its boundaries. The municipality of Penticton is about to follow suit and the working out of the problems of distribution, maintenance, renewals and extensions of the system will be watched with keen interest by other sections of the province.

## IRRIGATION DISTRICTS.

In the writer's opinion the ultimate solution will be found in the creation of 'irrigation districts,' after the model of some in California, notably the 'Nodesto' and 'Turlock' districts. These are semi-municipal in their constitution, and the ownership of the canals was acquired by purchase from the original companies. The funds were raised by a bond issue over the district, the interest and sinking fund being guaranteed by the State. The administration is in the hands of a locally elected district council under the presidency of the State Engineer. Payments for interest and operating expenses are met by assessment on the lands benefitted. This system has enabled the districts named to remodel in a permanent manner the original works, which the companies were unable or unwilling to do and the result has been extremely successful. There are 100,000 acres in alfalfa, vineyards and orchards, valued at \$20,000,000 and the cost of the system was \$3,000,000

## LAND COMPANIES.

At present with the two exceptions noted above, the various irrigation enterprises have been inaugurated and are being operated by land companies, who look to the enhanced prices obtainable for their lands to recoup the expenditure on irrigation works. Many of these companies, especially the earlier ones, put in works of a more or less temporary character and are now facing the necessity of renewing with permanent structures. The later companies are putting in modern systems, using steel and concrete, &c. The Central Okanagan and Belgo-Canadian at Kelowna, White Valley, and Okanagan Centre farther north. Fruitlands, at Kamloops, and B. C. Horticultural Estates, at Walhachin, are good examples of these. At Kelowna, on Dog lake, in southern Okanagan, a complete pressure pipe system for both irrigation and domestic water has been installed. This method ensures the highest duty for a given unit of water, and will be largely followed elsewhere.



White Valley Irrigation and Power Co., Ltd., Vernon, B.C. 36" continuous wood stave pipe, B. X. Creek.



## WATER SUPPLY.

The writer has made a special study of this region during the last five years and ventures the opinion that there will be found ample water for the available land, provided all the storage basins are utilized, open ditches and flumes dispensed with where feasible, and in the case of the Thompson valley and certain areas on the shore of Okanagan lake, pumping by electric power for the lower lands. To utilize the available water to the fullest extent, there must be elasticity in the titles and water rights to permit of free exchange of water originating at a high level for equal quantities at a lower level, where such exchange would result in the water in each case being used where it would be most beneficial. The earlier rights were granted for the use of water under very different conditions than those obtaining now and the duty of a second-foot can be doubled or trebled with modern systems installed. The hydrographic survey now in progress will it is hoped throw much needed light on this subject of the actual and possible duty of water, and the data in the hands of the Water Commission will enable that body to adjust the various rights so that the highest duty may be realized.

## STORAGE.

One of the chief factors in improving the supply and extending the areas of irrigated land will be found in the utilizing of the natural storage basins, which are abundant in the mountains bordering on these valleys. Some localities are more favourably situated in this respect. For instance the water stored in Lake Aberdeen, the reservoir at the head of the White valley system, cost 60 cents per acre-foot while at Penticton the reservoir cost \$17 per acre-foot. In Colorado, where storage is as vital a question as it is with us, many companies have built large reservoirs at a cost of \$50 per acre-foot.

## COMMISSION OF CONSERVATION.

Hon. Clifford Sifton, chairman of the recently appointed Commission of Conservation for the Dominion, in his extremely able inaugural address laid great stress on the necessity for sound legislation regarding the titles to water and water rights. He stated that he knew of only two instances in the Dominion in which this question had been dealt with in a progressive spirit, citing the Northwest Irrigation Act and the Ontario Water Power Act. It is possible that Mr. Sifton was not acquainted with the Water Act of this province. This was framed with the assistance of those responsible for the Northwest Act as well as the experience of those States whose conditions more nearly approach those in this province than the Northwest. With the proper machinery in working order, this Act is a model of what such legislation should be. Principles are laid down and the detailed working out of them is left to a specially constituted body with full powers to deal with varying conditions.

Referring to the Commission of Conservation—the report for 1910 should be read by all interested in the subject of Irrigation; especially is the Chairman's inaugural address worthy of careful study. It is a broad and statesmanlike document, blazing the trail for us all to follow. It is very desirable that this association should take some action at this session towards co-operating with the commission.

## HYDRO-ELECTRIC POWER COMMISSION.

Mr. Sifton's second illustration of progressive legislation is the Hydro-Electric Power Commission of Ontario. A similar commission in this province would result in much good, and a large field for its powers exists in the thousands of acres of land within practicable pumping level of the inexhaustible supplies of the Okanagan lake and Thompson river. Nature has provided the means of generating the necessary power at Adams lake, Shuswap falls, Okanagan falls, and other points in reasonable proximity to the lands. The creation of such a commission who could deal with properly constituted irrigation districts would do more to develop this section of the province in five years than private enterprise will or can in fifteen.

## SPILLWAYS.

To turn to a few of the practical points in connection with irrigation here. A necessity, especially, in a hilly country, of any irrigation system is to provide some means whereby the whole flow of the ditch or canal may be turned out suddenly, as in a case of emergency. The White Valley Company is constructing such a spillway 6,000 feet long of a capacity of 400 cubic feet per second. It is in cross section the segment of a circle, chord length 9 feet with a rise of 3 feet. The bottom is of concrete 6 inches thick laid in place in slabs 6 feet long by 4 feet wide and the surface curved to a template. The sides are built up by concrete bricks 2 feet 6 inches by 1 foot 6 inches made in a mould to the circular form and shiplapped on opposite edges; after being laid and the earth rammed tightly behind them the joints are all pointed with cement mortar and the whole surface then covered with tar and asphalt. A feature of this spillway is that it is also used as a supply to several laterals. This is effected by means of concrete pipes in the floor of the spillway at a level above the lateral, which is so constructed that any water not entering the lateral by reason of the gate being completely or partially closed, spills back into the main canal. A very nice regulation of the quantity entering the lateral can thus be effected.

## MEASURING APPARATUS.

At certain important points in the system records are kept of the flow over Cippolletti weirs by means of clock-work recorders. The cost of these (we have very satisfactory ones from Glenfield & Kennedy, of Glasgow, which cost installed about \$30 each) is too high to permit of them being placed at each user's gate. A cheaper mechanical device for measuring such quantities as would be used on ten or twenty acres is still to be found. Experiments have been made with tumbling meters, clepsydras or water clocks, &c., but there is no device as satisfactory as the clock-work drum recording the varying height of water falling over a weir. When this apparatus can be made in standard sizes in large enough quantities to make it cost about \$10 or \$15 this particular problem will be solved.

## GATES.

For gates in small or large ditches an iron disc penstock is inexpensive and satisfactory. A wooden pipe is passed through the bank at an elevation 1 foot lower than the bottom of the ditch. A saucer-shaped depression is made in the bottom of the

ditch so that at any stage of water a full head can be drawn off, and there is no dangerous obstruction in the ditch as in the case of the old style wooden box and gate.

#### WOODEN PIPES.

My experience with wire wound wooden pipe leads me to the conclusion that when used for domestic purposes, kept full and saturated, and buried below the frost line, it will last as long or longer than iron. But if used as a flume only partially buried and allowed to dry out it will soon show signs of decay, and especially so if there is any alkali in the soil. In laying such pipe this can be obviated to a great extent by coating each joint as laid, taking especial care to cover the ends of the sleeves or collars.

#### SIPHONS.

Large siphons of wood stave pipes are used in some of the systems, one on the White Valley system being 36 inches in diameter. The capacity of these large wood pipes is from 30 to 40 per cent greater than the theoretic capacities computed by Kutter's formula. A large number of air valves at the upper ends of the pipes have been effective in reducing vibration and thumping when the pipes are discharging only partially full.

#### LAWN AND GARDEN IRRIGATION.

The town of Vernon is within the area served by the White Valley system, and this has led to the installation of a pressure system for the irrigation of lawns and gardens. The pipes are fed from a small balancing reservoir, of about 1½ acre-feet capacity. The reservoir is filled from a 12-inch siphon, one mile long, from the main canal. A great stimulus has been given to the beautifying of the town where this system is in operation.

#### PIPE DISTRIBUTION.

The distribution over the lands of the Belgian syndicate, north of Vernon, is also effected by pipes under pressure, some of the lines being under 400 feet to 450 feet head. The manufacture of glazed cement pipe, capable of sustaining pressure of 100 pounds to the square inch, has been started at Peachland on the Okanagan lake. It is quoted at prices about equal to wood pipe, and if the manufacturer's claims are substantiated in practice, there is a wide field for it in these valleys.

#### CEMENT LINING.

The practice of lining ditches with concrete has made some progress in recent years, and the consequent saving of losses by seepage have fully justified the additional expense. The time is not far distant when every open ditch will be so lined, increasing the area that the same amount of water will irrigate.

## AVERAGE COST.

The average cost of reclaiming lands by irrigation in the district has been from \$30 to \$80 per acre according to the character of the works. The annual cost to the user has been steadily rising as the more expensive type of work has been put in. The average annual cost per acre may be put at \$5, some of the earlier contracts being much lower than this and in some of the later one as high as \$8 per acre. The average difference in value between land irrigable and similar land incapable of irrigation is \$100 per acre.

## CONCLUSION.

These random remarks are not offered as a complete or comprehensive study of the subject, but it is hoped that it has been shown that in these valleys we have a region of magnificent prospects, just beginning to be realized; that serious and earnest attempts are being made to develop the water resources by modern methods and works of a permanent character. It behooves us in this room to do all in our power to assist in laying the foundations of this development on sound and true lines, in the matters of legislation, organization, and construction, so that the coming generations who will enjoy the fruits of our labours shall say 'Our fathers built wisely and well.'

The CHAIRMAN.—I think we are very much indebted to Mr. Ashcroft for his interesting and practical paper. I forgot to say it before and I will say it now before we proceed to the discussion of the resolutions, that this present session will be the last opportunity of handing in any resolutions and it has also occurred to me just at this moment that probably it would be well to have a resolution passed by the convention requesting the Dominion government to do as they have kindly done in the past, print the proceedings of the convention. They have done this in the past years and I have no doubt will be willing to do so this year as well and I think it would be well to have a resolution passed by the convention that they be asked to do so.

I have been asked to call attention to the boat trip to-morrow, the trip by boat up the North river to Fruitlands, the intention being to take the delegates to see the work being done there. It is the intention to provide a lunch up there before the return.

## RESOLUTIONS.

The report of the committee on resolutions was then taken from the table and discussed.

## RESOLUTION. No. 1.

*Moved by Mr. Ashcroft, Seconded by Mr. Agur.*

'Whereas irrigation projects have been and are being hampered by the failure in the British Columbia Water Act to make provision for allowing water, which has been recorded and is appurtenant to certain lands, to be separated from said lands and thrown into and amalgamated as a part of a general project;

'Be it resolved that this convention strongly urges the government of British Columbia to amend the Water Act so as to provide for and allow such separation and amalgamation.'

Mr. SEMLIN.—I would like to hear from the chairman of the committee what is the intention of the resolution and just how this will work out.

Mr. ASHCROFT.—The resolution was introduced with the idea of getting over difficulties, which can arise in a number of ways in this province, of municipalities wishing to own irrigation systems. The irrigation projects which have been developed in this province generally begin by acquiring one or more blocks of land which were formerly owned by separate ownership. The company so acquiring those lands, proceeds to construct an irrigation system in which they use all the water available and all records they have acquired for these lands, and frequently take out fresh records for the storage of water, proceeding then to cut up those lots irrespective of the original boundary, treating it as one property and cutting it up to suit their purpose, with the result that a ten acre lot may be a part of one 320 acres on one side and also part of another, and the records may be different in priority and amount. The construction of the irrigation systems may change the whole basic features of distribution of water, and it may be, by thus amalgamating, place water on entirely different soil. The resolution is to allow the companies to amalgamate the records and to secure the priorities and distribute it to the amalgamated records acquired under the new system. It is merely a matter that has arisen under the changing conditions of municipal and corporation ownership.

Mr. ACTR.—Mr. Chairman, ladies and gentlemen,— You are aware that this resolution deals with the natural changing of conditions. It is necessary that we water users, water carriers and water distributors, if we are not protected by the Water Act, and amendments when they are passed, endeavour to see that such amendments are passed that will afford the necessary protection. When attending the Irrigation Commission at Spokane the Act was handed to a gentleman from Utah and considered one of the leaders in irrigation in the United States. This gentleman made a study of the Act and in discussing it he said that in his opinion it was far ahead of the Water Act of the United States, but the crucial point was the distribution of water. As the amendments come up from time to time it is for us as an irrigation convention to bring before the government our requirements, as we should be hand in hand with the government. Prof. Carpenter when he was with us at Vernon made a statement complimenting the Act very highly, and he said that while the Act may be perfect to-day it would require changes from time to time to meet the requirements, different requirements for different localities. At Summerland the company take their water from Cow creek on the west side of it from which the water is taken to irrigate the southern portion. The Act does not admit of their distributing the water on the north side and at certain seasons of the year we do require and will require more water on the north side as the land comes under cultivation. We are simply asking through this resolution for power that we have not got at the present time and which the changes taking place require. I think it is patent to every clear-headed man that the best results cannot accrue to a new municipality unless the water can be used to the best advantage under the new system.

Mr. LATIMER.—I might say in this connection that in section 62 it says that 'Whenever a license is granted for the use of water upon any particular hereditaments, such license shall be deemed to be appurtenant to the hereditaments in respect whereof such license is granted and shall pass with any demise, devise, conveyance,

alienation or transfer of the said hereditaments.' And in the next section 63 'Any two or more licensees may, upon such terms as may be agreed upon, join together in constructing the works necessary to convey the water to their respective lands.' And in the next section it says what the water granted under these licenses may be. It seems to me that if the resolution is carried through it renders it possible to freeze out the small holder against his will. I do not know if that is the intention or not. I assume from Mr. Agur's remarks that it is not.

Mr. CURRIE.—There is one thing I would like to ask. Suppose a company who is amalgamating different tracts of land, did not succeed in getting all the records and there remains a record in between the amalgamation of those records, it might be a matter of considerable annoyance to a man in making a claim, and it seems to me the effect of our applying to the government for an Act to amalgamate those records will be to give time to the government through their officials to thoroughly sift the matter out. It seems to me that any addition to the Act which will make this a final thing, that would work automatically, would be too drastic altogether. I think it would be a more drastic arrangement than it is under the present Act.

Mr. THURPP.—If it is in order I would suggest that the resolution be amended to read 'with the consent of all the parties concerned.'

The CHAIRMAN.—It would be a question if the government considers this favourably, and decides to amend it along these lines, as to what form the amendment would take. It does not ask that any change in priority be made; what it does ask is that water which at present on the face of the records is appurtenant to certain lands, be separated from those lands and be used on others for the general project. And considering even that a company or municipality takes up an irrigation project through a large number of lands, and acquires a number of records appurtenant to those lands, they would want to have a main ditch and they would want to turn all the water separated into this main ditch and make use of them and be in a position to make use of the water in a better and more equitable manner over the whole area.

If, as has been suggested, this condition happens that the company or municipality have not acquired all the lands but there are outstanding parcels of lands, held by some individual that has a record from the same source, I take it that the legislation could be passed so that the rightful owner of outside lands is not interfered with in any way. He would be entitled to his water in accordance with his priority but the company or municipality or corporation desiring to avail themselves of this amendment would simply be allowed to turn all the water to which they have a right, into one canal and use it over any part of their system. They could not under this acquire any priority which they had not previously got, but it would enable them, instead of keeping separate and apart each 3 or 4 cubic feet or 100 inches as the case may be, that they want to work with, to turn it into their main canal. It may be that they might be using it on the land to which it was appurtenant but you could not tell when it got in the main canal. They would not be entitled to any more than the original licenses gave them the right to. It certainly would never do if the amendment was framed in such a way as to give them priorities to which they were not entitled or which they did not have before.

Mr. CURRIE.—Suppose that the company had a prior right on the stream and some other person had a parcel of land who had a subsequent right which was not

incorporated in that scheme, are those people entitled to amalgamate the prior rights with the subsequent rights? Surely not, and when the record is also insufficient, where possibly the record holder has 100 acres of land and only 50 acres that is irrigable but the record stands for 100 inches, if they amalgamate those licenses they can use the water on the whole land that is only entitled to subsequent right.

The CHAIRMAN.—The board of investigation would have to deal with the record as it stood and they would have to deal with the parcel of land to which it was appurtenant having the priority of record, and they might find that it was only entitled to so many feet per second, or they might have the right to put it on all land to which it was appurtenant.

Mr. CARRUTHERS.—It occurs to me there might be an injustice done if the resolution is put through in the exact wording as it now stands, but we are now provided with water commissioners who are to sit on these works. If the words 'at the discretion of the water commissioner' were inserted, would that not provide and protect all interests concerned. If the mover and seconder of this motion agree to it I move that those words be inserted. I would like to insert those words after the word 'amalgamation.'

The CHAIRMAN.—As there is no seconder I am afraid the amendment is not before the convention.

Mr. McDONALD.—I am one of the owners of land who have a first record on Cow creek, part of the municipality of Summerland but we do not come under the existing system of irrigation. Their irrigating water is taken from above, from the same creek. What a hardship it would be if those settlers in our part are compelled to lose their records or if it becomes part and parcel of the municipality of Summerland, and they object very strongly to our losing our prior records.

Mr. PATTERSON.—I would like to move as an amendment the words 'provided always that the records not contained in the general scheme or project shall retain their original rights.'

Mr. BROWN.—I second the amendment.

The CHAIRMAN.—Shall the words proposed to be added, be added to the original resolution?

Carried unanimously.

The CHAIRMAN.—All in favour of the resolution as amended signify.

Carried unanimously.

#### RESOLUTION No. 1A.

*Moved by Mr. Burwell, of Vancouver, Seconded by Mr. Byron, of Burnaby.*

'Whereas litigation is now pending before the Privy Council on the subject of whether the water within the railway belt of the province of British Columbia is vested in the Crown in the right of the Dominion of Canada or in the right of the province of British Columbia;

'And whereas the British Columbia Water Act purports to vest all waters within the province of British Columbia in the Crown in the right of the province of British



White Valley Irrigation and Power Co., Ltd., Vernon, B.C. Moulding concrete slabs for sides of spillway.



Columbia, and in the event of the said litigation terminating in favour of the Dominion, the said Act will be ineffectual as regards waters within the railway belt of British Columbia;

‘And whereas no Dominion legislation exists at present purporting to vest the waters within the said railway belt in the Crown in the right of the Dominion and authorizing the granting of new water records in the said railway belt under the authority of the Dominion.

‘And whereas a number of records have been granted by the province of British Columbia of waters within the said railway belt and applications for a number of records for water within said railway belt are now pending under the Water Act of British Columbia;

‘And whereas the determination of the said litigation in favour of the Dominion would in the circumstances have the effect not only of invalidating records already granted by the province of British Columbia of water within the said railway belt subsequent to the creation of the said railway belt but would also prevent the granting of water records within the said railway belt until such time as legislation has been passed by the Dominion parliament authorizing the granting of such records.

‘And whereas it is most desirable for the purpose of protecting the records already granted within the said railway belt and of enabling new water records to be granted within said railway belt;

‘Therefore be it resolved that an Act be passed next session of the Dominion parliament dealing equitably with all claims for water within said railway belt.’

Mr. LAURSEN.—I would like to remark that while I am in sympathy with and fully approve of the resolution, and particularly as I drafted it myself, although slightly different to the resolution as placed before the resolution committee—it was changed slightly, that is in the latter part—I feel that I can hardly accept it without getting an opinion from the meeting whether the resolution as suggested in the first instance is not the one that should be passed. I think it is a resolution of great importance and with the amendment I propose, I think should be passed by the meeting. My amendment is:—

‘That whereas the water within the railway belt is now a subject of litigation between the Dominion and the province of British Columbia.’ The Privy Council has heard the appellants and has reserved judgment. It would appear that the Privy Council did not think it necessary to call upon the Dominion to answer the appellant’s argument, which I think is a very fair indication of the Privy Council’s intention to decide in favour of the Dominion. If that is the case it is absolutely necessary that legislation should be passed at the earliest possible moment by the Dominion parliament to provide for what is otherwise bound to be a most unsatisfactory state of affairs. In case they decide that the Dominion has jurisdiction over the water within the railway belt and the province of British Columbia has not, then I think the effect of it will be that all the records which the province has granted in the railway belt ever since the railway belt was established, are invalidated, or cannot be said to be granted except by the proper authority, and that would be a great injustice on the part of those who up to the present time have thought they had proper and valid records and I have no doubt that the Dominion, in that case, would work together with the province to prevent the holders of those records losing the same. We yester

day had the premier of this province present and he promised the convention that whether the decision went to Victoria or to the Dominion the vested interests of the holders of such records should be held sacred. I have no doubt that the premier will do everything possible to carry out his promise, while I do not see how it is possible to carry out such a promise except with the co-operation of the Dominion. If the Privy Council holds that the province did not have any power to grant rights within the railway belt, then I do not see how the province is in a position to protect the rights of record holders except by inducing the Dominion to pass a bill to protect those rights. In addition to that until the legislation is passed by the Dominion there will be no means by which the records can be granted. As far as I am aware there is no legislation in the Dominion statutes. If it were true that no legislation had been attempted to be passed by the Dominion dealing with that state of affairs as might come about by the decision of the Privy Council, then I would say that the resolution as presented by the committee would be sufficient, although I think the last part of it where the resolution asks that the Dominion government pass legislation dealing equitably with those record holders, I feel that it is most unnecessary to ask the Dominion government to pass such legislation, as the Dominion government, or any other government is supposed not to pass any other than equitable legislation. and this the water legislation in the railway belt must be considered to be. It is an expression on the part of the convention that the government would not deal equitably with them unless they passed a resolution, when in addition to that it appears that the Dominion parliament at its last session, through its Minister of the Interior, introduced legislation attempting to deal (anticipating the decision of the Privy Council in favour of the Dominion) with the state of affairs which might come about. They introduced a bill which did not pass at the time, and if we were to pass this resolution and ask them for equitable legislation it would look as if the legislation as introduced by the legislature at that last session was not considered equitable by the convention, and it seems to me therefore that the attention of the meeting ought to be brought to the bill introduced by the government at the last session, Bill No. 187, and which, anticipating the decision of the Privy Council in favour of the Dominion, provided for, and took care for a certain length of time, of all water records granted by the provincial government within the railway belt until such time as those holders could come properly before the Dominion and ask for rights under the new Act. In addition to that it provided for disposal of applications within the railway belt and the bill further made provision for dealing with the applications of former record holders within the railway belt which the provincial government had dealt with. I would say further that it is a matter of great importance to know the different sections of this bill and without going into all the sections of Bill 187 I might say that section 3 makes the Act apply to all lands within the railway belt in the province of British Columbia, including the block containing three and one-half million acres in the Peace River district in the said province.

Section 4 is a similar section to the British Columbia Act, vesting all water in the Dominion government.

It is provided further in section 5 'No right to divert or use any water from any river, stream, watercourse, lake, creek, spring, ravine, canon, lagoon, swamp, marsh or

other body of water, within the railway belt in British Columbia shall be granted or acquired otherwise than under the provision of this Act.'

Then comes section 6, the section which I think is the most important section of the Act and which deals with the existing water records within the railway belt in British Columbia. I will read that section to you in full.

'The Governor in Council may, upon the recommendation of the minister, provisionally confirm and validate any instrument professing to grant any right, record, power, privilege or priority for the use of water within the railway belt for domestic, irrigation, mining, or other purposes, issued on or after the eight day of May, one thousand eight hundred and eighty and prior to the tenth day of May, one thousand nine hundred and nine, to any person, company or municipality under the authority of any Act of the province of British Columbia: Provided that any such validating order or confirmation shall be limited to a period not exceeding two years from the date of the coming into force of this Act, and that at and after the expiration of the said period the instrument so provisionally validated and confirmed shall be considered for all purposes as if this Act had not been passed and as if no validating order or confirmation thereunder had taken place.'

Now that section as it is planned, will provide as fully as is possible under the circumstances for the rights of those record holders within the railway belt and the idea is that until such time as new records can be granted by the Dominion, those people can come and get temporary licenses until the matter can be fully dealt with.

Sections 7 and 8 deal with new applications under the Act. Section 8 giving priority of right to licenses. The priorities are similar to those granted under the British Columbia Act: First, 'domestic purposes'; second, 'municipal purposes'; third, 'irrigation purposes'; fourth, 'steam purposes.'

Section 9 provides for the powers of licensees.

And the last section of the Act provides for the making of regulations.

Now it seems to me Mr. Chairman that the bill as introduced by the Dominion House at the last session, is as equitable a bill and as just as we can expect the government to pass. It fully protects all holders of records within the railway belt, and the Dominion government in introducing that bill has shown its willingness to co-operate with the provincial government in so far as possible to protect the interests or rights of those record holders in the railway belt. I say that bill having been introduced by the government at the last session, it was discussed and for some reason it was laid over to the next session. It seems to me that if that bill, in the opinion of this meeting, deals equitably with the rights of holders of records within the railway belt, then the meeting cannot do anything better than endorse the government's act in introducing that bill, by expressing itself in favour of the passing of such a bill at the next session of parliament, and whether the members of this convention are Conservatives or Liberals, it seems to me that this is a bill upon which all should join because it is not a Bill favouring one or the other but protecting the rights of all holders of records. If such an Act is not passed, if the decision of the Privy Council is in favour of the Dominion, the holders of those records could be placed in a very unsatisfactory position. I would ask therefore that the meeting instead of asking the government to pass legislation dealing equitably with the matters in the railway belt, approve of such a bill as I have read and as has been introduced in the Dominion

House at the last session, and ask that the government pass a bill along similar lines at the next session, and the resolution that I have drawn up, and submitted to the resolution committee, provides for and embodies this bill in it. I might read the section dealing with that. The first part of my resolution is identically the same as that printed and passed on by the committee, but after that—

Mr. POOLEY.—Mr. Chairman, I rise to a point of order. How long is a member allowed to speak in the discussion of different matters?

Mr. HALL.—The time, unless extended by courtesy of the convention is five minutes.

Mr. LAURSEN.—I will read the resolution I drafted on that point. It comes in after the fifth recital.

‘And whereas a Bill (No. 187) was introduced in the Dominion parliament at its last session temporarily validating records already granted by the province of British Columbia within the said railway belt and authorizing the granting of new water records within the said railway belt under the authority of the Dominion of Canada so long as such authority is vested in the Dominion; which bill was laid over till the next session of parliament.

‘And whereas it is most desirable for the purpose of protecting the records already granted within the said railway belt and of enabling new water records to be granted within said railway belt that the said Bill (187) or a bill on similar lines should be passed.

‘Be it resolved that this meeting is strongly in favour of the said Bill (187) or a bill on similar lines being passed at the earliest possible moment and that a copy of this resolution be forwarded to the proper authorities at Ottawa.’

Now that is my resolution as originally drafted and I would move that amendment to the resolution putting it in the shape as drawn by me.

The CHAIRMAN.—I take it that you move to have struck out the last recital and operative of the printed resolution and insert the last two recitals and operative of your original resolution.

Mr. HALL.—The resolution committee is for the purpose of bringing before the convention only things relevant to the convention and I would like to hear the explanation of the resolution committee why it changed the original resolution.

Mr. ASHCROFT.—I would ask Mr. Pearce to explain.

Mr. PEARCE.—Our reason is that the resolution committee had not before it a copy of the Bill as cited, and experience has shown where a Bill is introduced in one session of parliament, on its introduction at the next session very often changes are made, and we did not want to express ourselves to the effect that they should pass a Bill exactly as it was introduced. If the mover had given us a copy of the Bill we did not have the time to go through it, and we are aware that the Bill had a great deal of discussion in the House when it was introduced.

Mr. BILLINGHURST.—I wish to second Mr. Laursen's amendment.

The CHAIRMAN.—That is by striking out the last recital and operative part?

Mr. MARTIN BURRELL.—I would be very much opposed personally to seeing such

an amendment pass the convention. I agree with him that the whole resolution as passed by the resolution committee is harmless but not necessary, but the convention, to my mind would be very wrong in passing the amendment. The gentleman in moving this suggested that the bill was laid over for some reason or other, and I might point out that the bill is not laid over, it is killed, and I may say that the government is trying to introduce a bill that will satisfy equitably all of the claims of the holders of records in the railway belt. I might add that the discussion on both sides of the House over this bill was very extensive and takes up sixty pages of Hansard. A new bill will have to be introduced and I think it would be impertinent if this irrigation convention took upon itself to amend a bill that has been dropped by practically the consent of the whole House. I would like to say one more word. It is unnecessary if the decision of the Privy Council is in favour of the provincial government, and, if the decision is in favour of the Dominion, the Dominion government is bound to pass a bill that will deal fairly with the record holders in the railway belt; and let me add with reference to the mover's remark that Premier McBride had said that the vested interests of holders of such records would be held sacred: I did not understand the premier to say that, I understood the premier to say that those rights should be sacred. I think it is incumbent upon the government irrespective of party feeling to see that legislation is brought into the House to protect the rights of record holders.

The CHAIRMAN.—It seems to me that if the convention is to consider the amendment now before the convention, every member should have a copy of the bill in his hand and go over it carefully. As Mr. Burrell has told us the members of the House went through it and spent a lot of time in discussing it, and if I remember correctly the Minister of the Interior made a statement that he proposed to amend it in several important details. That being so the bill the minister proposes to put through the House at the next session is not the bill introduced last session and to which this amendment has reference, and the minister admitted himself, before the document was killed, that it was open to amendment, and I imagine that he intends to amend it and if we pass the amendment we would ask the Dominion government to pass something the Minister himself announced he did not intend to pass as introduced. Does any one present wish—

Mr. LANG.—I move that this resolution be laid over until the next annual meeting of this convention.

Mr. GILLESPIE.—I second the motion.

Senator BOSTOCK.—I would like to say a few words. It is quite true what Mr. Burrell has said about the discussion that arose in the House on the introduction of this Bill but this resolution as it stands at the present time on the paper is in my opinion so arranged that it is no good. If we are going to pass any resolution we should amend it so as to give expression to the feeling of the convention. You said in your remarks just now that it was killed. Mr. Laursen does not intend to tie the hands of the government to pass that Bill (187) as introduced last session. His amendment is that a bill on similar lines, according to the feeling of the government and members of the House, should be passed in the interest of the people who own water records and are interested in the water question in the railway

belt. I think myself that it would be made very much more definite if we passed a resolution at all that we passed one similar to the amendment proposed by Mr. Laursen.

Mr. A. E. HOWSE.—It seems unfortunate for the people living in the railway belt to allow this matter to fall through by giving this resolution a six months hoist. It seems to me that for the protection of the people living in the railway belt, those interested in water rights, something should be done, and done as quickly as possible. We are a representative body of men coming from great distances, and we would be very neglectful of our duty if we did not urge on the Dominion government the necessity of bringing in legislation at the earliest possible moment. In Mr. Laursen's amendment he refers to Bill 187 or a bill on similar lines. He does not say 'pass that bill,' but he is urging the government to act, and to act promptly. I think that as a representative body of men we should be very careful to let both governments know immediately that we want legislation in the interest of the people in the railway belt and I hope that some expression will be given by this convention asking the Dominion government to do something and do it quickly.

Mr. MARTIN BURRELL.—I want to add to what Mr. Howse has said. Those gentlemen who were not following the discussion in the house are not aware of the great interest that was shown in the House, and while the bill was withdrawn every one realized the absolute imperativeness of doing something at the earliest possible moment, not only those who were supporting the government but also the members of the opposition, but it was thought that until the Privy Council's decision was handed down there was no object in passing it and it was intimated that as soon as that decision was handed down a bill would be introduced by the government, covering all this ground, and I do not feel that Mr. Howse need to fear that the House does not recognize it is a matter for hurry and I am sure the House does recognize this. Mr. Oliver also knows that the bill must be put through as speedily as possible.

Mr. BILLINGHURST.—Now that the decision of the Privy Council is going to be held up for we do not know how long, I think one of the reasons of this resolution was to make provision for the meantime and that is what we want, something right away. If the Privy Council is going to hold up their decision for some time then who are we going to look to, and that is the reason I second the amendment.

Mr. MARTIN BURRELL.—It is quite true that to those record holders in the railway belt the bill and the amendment as suggested are both good, both making the same demand to settle this question by legislation as speedily as possible. I might say that if this bill or another is brought down I will be only too delighted to act alone or with your representative in carrying out your wishes, whether the Privy Council's decision is handed down or whether it is not.

Mr. MAXWELL SMITH.—I am sorry that I cannot agree to support either the amendment or the amendment to the amendment as I feel that they are unnecessary and should not be passed by this meeting. I think if any question such as this is not to become a political football between the Dominion and provincial governments we should avoid anything that would look like a political discussion in this convention. I think the amendment might savor of politics, and the amendment to the amendment as proposed by Mr. Lang simply gives this a year's hoist and brings it up again.

There has been some reference to the length of the speech of one speaker. His speech may have been a little long but if I were to attempt to criticize in any way this matter it seems to me a little too much time is given to the rustling and reading of papers which to say the least excludes a full discussion of the different matters raised. I think we should give more time to the discussion of the resolutions before this convention than seems to be available on the programme. I have much pleasure Mr. Chairman in suggesting that this convention vote down all three resolutions and pass a simple resolution requesting 'That the Dominion and provincial governments co-operate in the settlement of the water rights in the railway belt.'

Mr. HALL.—There is an amendment to an amendment. That is, for a six months hoist.

The CHAIRMAN.—The question before the convention at present is the amendment to the amendment, that the resolution be considered at the next session of this convention.

Mr. LANG.—If I might be permitted to withdraw my amendment and refer it back to the resolution committee in order that Mr. Smith may move his amendment, I would withdraw my amendment with the consent of my seconder, Mr. Gillespie.

The CHAIRMAN.—The resolution committee having passed upon this and presented it to the convention I think the better way would be to move the amendment and leave it to the convention.

Mr. SMITH.—I beg to move an amendment to the amendment, Mr. Lang having withdrawn his amendment to the amendment, my amendment being 'That the Dominion and provincial governments be urged to co-operate towards a speedy settlement with reference to water rights in the railway belt of British Columbia.'

Mr. PALMER.—I will second the motion.

The CHAIRMAN.—I think the amendment had better go a little further than that, strike out the whole resolution and substituting that.

Mr. SMITH.—That is what I mean.

The CHAIRMAN.—Are you ready for the question? You have heard the amendment. That the original resolution and amendment be struck out and this one substituted. All in favour?

Mr. BYRON.—As the seconder of the original resolution I would like to say a few words. The provincial government has done all they can, and if the decision of the Privy Council should go against the provincial government, the gist of the whole thing is, 'That the Dominion government be asked to, &c.' I think the resolution should be carried as originally resolved.

The CHAIRMAN.—I thought that I put the question. I asked if there was any further discussion. Is there any other gentleman wishes to speak on it, and if not I will put the question as I have already said it. We had better take a standing vote. All those in favour of Mr. Smith's amendment kindly stand. I declare Mr. Smith's amendment carried.

I think there is a good deal in what Mr. Smith said. Certainly these discussions are of the utmost importance and a time limit should be given out and kept to.



Flume across the West Arrowwood, Southern Alberta Land Co. Capacity 1,200 second feet.



## RESOLUTION No. 2.

*Moved by Dr. Dickson, Seconded by J. A. McKelvie.*

‘Whereas the existing conditions of ownership and control of irrigation systems in British Columbia are very unsatisfactory; resulting in waste of water and inadequate distributing system.

‘And whereas certain districts have not the necessary capital to install irrigation systems, thus leaving large areas of good land useless because of insufficient water supply;

‘Be it resolved that it is the opinion of this convention that the government of British Columbia should take steps looking towards the introduction of a system of governmental ownership, conservation and operation of water systems for irrigation in the dry belt, to ensure a fair and equitable distribution according to the Water Act.’

Dr. DICKSON.—This is an exceedingly important resolution and it is getting near lunch time and a good many of the delegates will be leaving before the hour and I feel that this motion should be presented when the full meeting is here to do it justice.

The CHAIRMAN.—You are asking for it to stand over until the first of the session this afternoon?

Dr. DICKSON.—I move that we adjourn.

Mr. BAYTON.—I second the motion.

Carried.

**AFTERNOON SESSION.—THURSDAY, AUGUST 4, 1910.**

## RESOLUTION No. 2.

Dr. DICKSON.—Mr. Chairman and gentlemen: In the first place in speaking to this motion I would like to call the attention of members of this convention to the fact that the petition that was presented to this convention yesterday signed by so many in the district surrounding Kelowna, is practically embodied in this resolution and is the expression of the feeling that exists among the ranchers and land owners there, and that will possibly have some considerable weight with the delegates here in this convention. While I may be speaking perhaps more particularly with reference to the conditions that exist in the Okanagan valley, from the remarks that were made here yesterday by the various speakers these same conditions seem to prevail not only in the Okanagan valley but all through the province of British Columbia, where irrigation is practised for the production of our fruit and grain, and I hope that I am not looking at this question from a too purely local point of view. Yesterday when the premier of this province was speaking to the convention, he assured us of the hearty sympathy of the government of British Columbia in anything that might be done to better the conditions of irrigation and irrigation projects in this province

and I think that this convention may justly congratulate itself on such an expression from the head executive of the British Columbia government.

Premier McBride pointed out the immense increase that has taken place in the land values of British Columbia owing to irrigation, six million of dollars having been added to the land values of the province, worthless lands being made valuable when brought under irrigation systems. He also assured us that the provincial government was taking a hearty interest in the progress of the public service by irrigation water and also expressed the opinion that the people interested and the government, should act hand in hand for the best results to the country. We have also heard the president give some details and figures relating to the United States, in Colorado where, out of some \$125,000,000 worth of products, over \$90,000,000 were agricultural products and a large proportion of that \$90,000,000 were the results of irrigation.

In advancing a principle such as is embodied in this resolution it is necessary to state it generally; we cannot go into details and tell the executive how a scheme such as this can be worked out. What we want to do is to bring the subject to the attention of the government, and if they see fit to act on the suggestion such as we have made, I think we can safely leave it in their hands to work out the details in a manner that will be satisfactory and agreeable to the parties concerned.

In taking up some of the points which most strongly bear on this question we want, in the first place, to emphasize the fact that has been brought before this convention, namely that hard feelings exist at present regarding ownership of water in the province. No one can regret more than I do this talk of shooting, and at the same time these opinions are expressed and there must be something back of them, and it is simply bringing to a head this bitterness that exists between members. There is no question of this and the sooner something is done to prevent such expressions being used, or give cause for such expressions to be used, the sooner we can congratulate ourselves that an immense step has been taken in the adjustment of this question. In the first place I think that it is the duty of every record holder in this and other parts of British Columbia who depends on irrigation, it is the duty of every land holder, to see that every square inch of land available is brought under irrigation. The prosperity of the individual does not depend on what his own land may produce, it must depend to a large extent on what his neighbours are producing. If our neighbours are not producing good crops, that is, if say half of the members of a community are not producing good crops that is bound to detract from the value of the whole valley. Success does not depend entirely on what we do ourselves, but partly on what our neighbours are doing. And one point that I want to emphasize is that we want to have all these valleys, every square inch available brought under cultivation and that must be done by irrigation. One dissatisfied landowner or rancher who is unable to get the necessary supply of water for the success of his crop is the worst advertisement for his particular district, and cannot be counteracted by thousands of dollars of advertising that may be sent out by the government and private companies. We want to prevent dissatisfied landowners going out from any of the valleys and advertising adversely.

Under the present conditions I think it is agreed by all that we have not sufficient water to irrigate properly all the land that we would like to bring under cultivation. The only way this land can be brought under cultivation is by an adequate

system of storing water, water that in the spring of the year rushes down the rivers and goes practically to waste. If some adequate system were introduced by which all this water going to waste could be stored until the dry season comes, I think it will be agreed by everybody present that there will be enough water held back to give every rancher a fair supply of water all the year around. The question arises what is the best method of storing that water. At the present moment I understand the British Columbia government has surveyors attending to this work to a certain extent. Surveys are being made of all creeks and rivers, surveys are being made of the headwaters of these rivers to estimate what amount of territory can be supplied and the best methods of conserving that water. When you consider the immense area that has to be served by this irrigation system, it is almost impossible to expect any corporation, municipality or individual, no matter how large its capital might be, to carry out an irrigation scheme on a large enough scale to benefit the community as a whole. We may get a municipality or corporation able to conserve water by placing certain dams on the river to supply a certain limited district, and the latter district may get all the water that might, if it was carried out on a large enough scale, benefit the whole valley, or any particular valley, and if some adequate scheme could be devised whereby these immense rivers could be properly dammed back in the spring of the year, all that water, or a very large portion of it, now going to waste could be held back until it was most needed.

Possibly no corporation is in as good a position as the government to take hold of a scheme such as I have outlined, and really, while I would like to say I do not wish any remarks that I may make here to be construed to be in any way of a socialistic tendency, that is the farthest thing from my mind, at the same time it is my opinion if some adequate system, some adequate plan available whereby our government could lend their aid as directly as possible for conserving this water going to waste, then the greatest good will come to the greatest number of irrigators and ranchers all through our province. Water is something that the country needs as a whole. Everybody needs water and those who are living in the dry belt must have it for irrigation, and (looking at it from that point of view) the public themselves should control the water. How can that be done without inflicting a hardship on any one individual. In my opinion the only natural solution of that difficulty is for the government of the province, which is directly responsible to the people, to take hold of those problems and try and work them out for us. We do not want to say how they should be worked out in detail. We simply want the government to see if some scheme can be devised whereby the greatest good can accrue to the greatest number in these dry belts.

Another point where the government has an advantage over any individual or corporation, the government has all the facilities for such an undertaking. The government has its own engineers, the government has all the machinery practically necessary in the first place to make surveys of all creeks and water storage and headwaters; they have their materials and mechanism for constructing waterfalls, dams, &c., in a much greater degree than any private corporation or any municipality could have.

Then under the present system a great many of the landowners are complaining of the excessive charges which are made for delivering water to their property. If this matter were taken over as a government project to store and conserve all the water

surely it stands to reason that the government can in the first place borrow money at a lower rate than any municipality or corporation. The government has the power to extend the repayment of that money over a number of years so that if, later on, you wish to pay back the cost to the government as they are entitled to, this is done so that the cost does not fall too heavily on any one individual in any one year.

Looking at it from another view, the government can re-imburse itself in another way. At the present time there are thousands of acres of practically no value, nothing growing on them, and taxed at a very low rate, and consequently the government does not receive a fair return. Later, from the immense areas, as soon as water is put on them, the land values increase, for the land becomes productive, and that increase in land value must necessarily increase the taxable value and the government gets back a large percentage through taxes, whereas, under the present condition, the land is practically valueless for raising crops or stock, and the government gets little or no return.

I do not intend to take up the time of this convention any longer. There may be other points brought up and discussed under this most important resolution. I hope that the discussion will be opened up and those present here will express their opinions freely, so that we may be able to get some resolution from this convention and send it to the government in some strong form so that they can give it their serious consideration.

The CHAIRMAN.—While perhaps we can allow the mover of a resolution more than five minutes, I think any other member of the convention wishing to speak should confine himself to about that time.

Mr. McKELVIE.—While I consider this as really the most important resolution that will be dealt with by this convention, I am in the happy position of following a gentleman who made the case so clear that really very little remains to be said. I do wish to say, however, that this convention misses a great deal in the fact that the Chief Commissioner of Lands is not present. Hon. Price Ellison brought forward two years ago at the convention at Vernon a resolution along similar lines to this, and I think the discussion which he introduced then has at least paved the way to enable this convention to accomplish something.

There were several things that obtruded themselves into the convention at Vernon two years ago that perhaps had the effect of making the decision then arrived at not a fair expression of the opinion of the average man of the province. What I mean is this: The situation was new to a great many people and they did not understand all that was involved, and then there were diverse interests concerned which possibly had something to do with the Vernon convention deciding that it was not opportune then to ask the government to bring in a system of control of irrigation as a government measure, but I believe that since then the sentiment of the province has developed along the lines advocated in this resolution. You are aware, sir, that when the government of British Columbia expressed its intention some three years ago of bringing forward an entirely new Act respecting water, there was a feeling throughout the province that very probably something would be done by the government to assume the control of water records. You did not see fit, as father of the Act, to carry that expectation into effect, and I dare say that you were quite justified in following the course which you then adopted. but I do believe that now there has

come about in this province such a situation that the great majority of the people who are interested in the interior of British Columbia, in farming on the irrigation system, have a right to ask the government to bring forward some system of ownership by the public, and assist us to irrigate the province of British Columbia, for the interior section lends itself, as perhaps no other section of the world does to the conservation of water.

Unfortunately it has become impossible for private enterprise to cope with the situation as it presents itself. More money is required to bring about the construction of irrigation systems than by any single individual or company is likely to invest in it. We had the privilege yesterday of listening to several addresses, especially from the premier of this province in which optimism dominated every word, and I think I am safe in saying there is no part of the Dominion where the prospects are so bright as ours. We now have a revenue larger than any other in the Dominion, except Ontario, and it does not seem improper that, with a revenue of \$8,000,000 in sight within the next few years, at least \$2,000,000 should be set apart by the government for the support of an irrigation system by the government. In the preparation of this resolution it was impossible to go into details but I would like to say this, that now there does seem to be an opportunity for the province of British Columbia, taking in view the fact that it possesses to-day a revenue which makes it possible to carry out such a system as I believe should be adopted. If the opinion of this convention was sent to the government that the people of British Columbia believe it is the duty of the government to set aside a certain sum to exploit an irrigation project, I believe the government would be inclined to treat such a proposition favourably and I would like to see this meeting pass some such resolution.

Mr. CARRUTHERS.—I would ask to which you refer? What is the intention of the resolution, government control or government ownership?

Mr. McKELVIE.—Both I think.

Mr. CARRUTHERS.—There is a great difference. Government ownership is rot.

Dr. DICKSON.—Mr. Chairman, in presenting the resolution we merely say that the government of British Columbia should take steps looking towards the introduction of a system of governmental ownership, conservation and operation of water systems for irrigation in the dry belt.

Mr. KENNEDY.—The importance of this resolution must strike all of us as being so great that with the consent of the mover and the seconder I would suggest that a committee be named to confer with the government to bring about the result as quickly as possible, and without having the approval of the gentlemen, I would mention Mr. Ricardo and Mr. Agur as being proper persons and representative men as a committee for that purpose. The government necessarily will require to be guided, they want to know what the particular object is and how to bring it about, and I think a committee appointed by this convention is very important.

Mr. POOLEY.—Mr. President: This has opened up a question which is rather more interesting than usual and the mover and seconder have treated it in a very able manner, but it is a question that is more far reaching than seems on the face of it. As you are aware government ownership and government control are two different matters. We have government control, and would welcome government control that

enables us to guarantee our water works, &c. Government ownership will prevent any private enterprise for all time in this matter. There are many new people coming to British Columbia willing to invest money in British Columbia projects, well controlled as they are. If this convention advocates government ownership it will be a serious mistake; it will absolutely stop any movement of this sort, of monied people moving into British Columbia. Mr. McKelvie pointed out that Hon. Price Ellison advocated this at Vernon. Mr. Ellison is now a minister and is he in the position to advocate as a minister what he might advocate as a private member? The excessive charges that were referred to are entirely within the range of the water commissioner. Municipal control and municipal ownership is an entirely different thing from government control and government ownership. A corporation is the proper agency to take hold of the water systems and control them.

Mr. PALMER.—In studying this resolution it occurs to me that the convention would be making a mistake to accept the resolution as worded. Although it is not definitely stated, government ownership is evidently contemplated, and this will make for the abrogation of water rights, and on that ground I think the resolution as it is worded should not pass this convention.

Mr. CURRIE.—I happened to be in Vernon when that resolution was brought up. I voted against it then and my reasons I gave while there. As you well know, and many of the gentlemen at this convention know, no government, and I made this statement at Vernon, two years, no government will attempt a thorough system of controlling the water of the railway belt without first instituting a thorough system of hydrology, a survey that would take at least five years, and it would take five years more to establish and put this into effect. That is ten years and during that ten years in my opinion private enterprise is absolutely stopped. Can you afford to have private enterprise stop for ten years for the government to step in and control? The government have been working for the last three or four years with the best assistance possible; from the south and west and from every conceivable source they have been getting all kinds of data before they framed this Act, and before this Act has had time, before the government has had time to really establish this Act and prove to the people what it will do, we find a lot of people complaining it is no good, and leaving that and taking up government ownership. If we move here and there and everywhere, we will have nothing done. Let us assist the government to put that Act in force and give them a chance to prove what it will do.

While on my feet I will say this that I believe the government of British Columbia will find that the first and best effort they can make to settle the water difficulties of this country will be to immediately put this Act in force. What was the idea of a commission being appointed? I do not mean to criticize the government but although the Act has been in force fifteen months we have had one case tried and not finished. And there are hundreds of cases waiting, where people have waited for years to have their disputes settled, and yet this commission has worked on one case and will not work on any more until somebody makes a roar somewhere else and then they will go and sit on that. I would like to point out that in Wyoming they divided the state into four districts and had a water commission to settle the disputes of each district and they proceeded to sit on each dispute until they got them all settled and the people who did not feel they had justice had the right to appeal to the state

engineer and the other members who formed the board of control, and from that to the common court. But fortunately for the people of Wyoming there have only been three or four appeals in the whole four districts, and those people know what waters they have and what waters they have not.

In dealing with private enterprise, give it law and protection. I have seen the irrigated district for myself and while I believe a lot of benefit could be given by assistance from the government I think it wrong that the government should take away private ownership in the water. In the first place our difficulty is not that we cannot store the water, as any of you who are practical irrigators in this province who have been in touch with irrigation for twenty years in British Columbia will know, but after we store that water we find when we turn it into the stream the prior record holder takes it and we get nothing for it. What we want is proper enforcement of that law and a board of water commissioners to sit on disputed water matters and decide right away and not six months after when the crops are ruined.

Mr. HARVEY.—The principal objection seems to be government ownership and the objection against government ownership is that it will take five years or ten years whatever it may be for the government to reach a point where they can assume the ownership and during that five years all enterprise of the individual or land company will cease. I cannot see that is the case at all. A land company comes in and makes an investment, they come in and buy land at five and ten dollars, in arid land and invest money in an irrigation scheme. They put the irrigation scheme on and sell their land at the increased value from \$20 to \$200 or \$250 an acre. They make the interest on their investment and sell the land and as soon as they sell the land they are quite willing the country should take over the water and let them take the money they have got and go and invest it elsewhere, and they would be willing to sell out their interest in the water to the people directly interested in the land and let them manage it, and if the government were going to take over the water of the province in five years or ten years that would not interfere with the company. Something has been said about socialism. I do not think socialism has any place in the matter at all. I do not think that politics or socialism has anything to do with it. It is simply what will be the best for the greatest number, the best good for the people. As far as preventing companies reclaiming large tracts of land it is impossible for them to take it on a large enough scale, and if they have \$500,000 to invest they figure where they can get the best profit for their money by buying up so much land and putting on an irrigation system. They buy a certain parcel of land and they put on an irrigation system that will cover that particular piece of land and the land that is outside of that is left outside, with no means of getting water in the meantime. I have had a good deal to do with projects for irrigation schemes. In the interior there are hundreds of lakes sometimes eighteen and twenty miles long running one into the other and down a certain stream. The land company will get hold of a first record out of the creek and place a dam probably keeping 500 acres and they put water on that, and on all the land they have bought and they have no interest in going any further to dam up the water in those lakes to conserve any water. If the government had the doing of that they would work for the interests of the whole valley, they could go further and put dams on the other lakes.

Mr. CURRIE.—I would like to say one word more while I think about it. There is a feature about this thing that perhaps a great many have not thought of. A land company or individual holding a large tract of land either puts the water on themselves or would be very glad to get the government to put it on for the express reason that if the government put the water on their land, which is probably worth \$5 an acre, the government put it on at no cost to the individual and the individual sells it for \$200, at no cost to themselves and the government is put to the expense of collecting the fees from the persons who bought it from the land company and I think possibly a good deal of this government ownership may have a bearing on that.

Mr. LAWRENCE.—From the small settler's point of view I can just say this, that on the creek where I am, there are twelve miles to the main river running from the lake. There is not half of the land that is irrigated simply because the first record of water on that creek is taken for land that is situated on the border, that is right on the bank of the main river, and the consequence is that six miles of the land bordering the creek which should have the water from that creek is denied that water entirely in order to supply those lands that enter another stream or district entirely, so those six miles must remain in the arid condition in which they have always been. What has been said about water commissioners and the larger administration of the law is perfectly true in our district. We are all very good friends until we get a water famine as there has been this year and then we are all ready to put the first record holder in the lake and hold him there for a quarter of an hour; that is what we would like to do with him. A man may be perfectly honest as regards settling a bill but when it comes to a question of water he forgets everything but that he must have it. I say this water which ought to be distributed over the twelve miles could be deposited in a portion of the land from which the water could be easily pumped throughout those lands and make the water available for the whole country.

It is a matter of impossibility for us, good neighbours that we are until we have a season like this, to come to any agreement about the water. We cannot agree as to who is to have the water and who is not, and there is nobody else coming in to settle up that six miles of that creek until this water question is solved and I say that if the provincial government, who is the largest real estate owner, was to take the matter in hand as the mover of this resolution has been saying, with a view to dealing with these problems, it would result in the greatest colonization scheme that this province has ever seen. It would be the greatest advertisement that this province has ever had. People would come in with confidence and work the land with confidence knowing that they could count on a proper distributing of water and they could turn this semi-arid country into a promising country. As I said we cannot agree how this should be done. The best thing we did was some three or four years ago. We had a picnic. I furnished a camp and some furnished one thing and some furnished another and we went out there and put a dam in and that answered the purpose of conserving the water so far, and that was all we could do as a community, but the first record holder has to go twelve miles to open the gate to let the water on his land, and twelve miles back again and the same with each of us. And I say if we as a community cannot agree in a sensible, reasonable practicable way, who is going to do it unless it is the government? There is nobody else can do it and surely we have enough confidence in the present government. It did not need



what the premier said yesterday to give us that confidence. It is a big scheme and I do not expect that every district will be attended to at once. I only hope that mine will be the first, but if in five years twelve districts even were brought into the state that they ought to be in regard to this matter, I say it would be a very great stride in the right direction, and in the next five years after that, instead of twelve you would get a hundred districts put into shape.

What did the government do in regard to the delta? You know what the government could do in respect to keeping out the river, and it has paid them. If the government bring the water in, land that was previously worth \$5 an acre will be worth \$200. The government will have the first claim, the first charge against that land and they collect it as they collect the taxes. The matter is simple enough and they guarantee the money to do this. The province does not even have to put up the money. The bonds would have to be guaranteed of course and it would be sufficient security for capital, and that is what we want in this country; the capitalist to come in with a perfectly plain scheme before him in which to invest his money, and there is plenty of English and American capital that would come here if the government would say what was to be done. It all depends on the way the government takes this in hand. Then there is the conserving of the forests that are adjacent to water and I say there is no greater waster in this particular than the small settler, the man who comes in and clears 160 acres in order to cultivate that land. I am doing it myself; my son and I have been struggling with 320 acres for six years and it grieves me to see the magnificent timber that we split up into fire wood. We must get rid of it. I am too far from town to make it marketable and what we cannot get rid of that way we set it on fire and get rid of it that way. The government can come in and assume control of the water and assume control of the standing timber, and say this land shall be cleared or not cleared.

Mr. HARVEY.—I have had twenty years experience in the Kelowna valley. We can claim quite a little bit for our corporations that are working out there, but the great problem is that there is so large a dry belt that all the good that is wanted is not being accomplished. The government is at the present time spending \$7,000 a day on Mission creek keeping it out of the country, while if they spent a quarter of the amount and gave the farmers there charge of the actual water on the land, better results would follow. This is what we want. The companies are all right for the companies, but as a general thing for our country here it will never do. If it had been publicly known that this convention would be open to the farmers of the province we would have had enough here to-day to represent the farmers, but as it is the corporations have the say.

Mr. HAWKS.—We seem to have swung in a great circle since yesterday afternoon. At that time I began my remarks by saying that although we had a very useful Water Act we did not seem to be administering it. Many people speaking since then have endorsed that statement. I think perhaps I am the party to whom they referred as advocating the shot-gun policy. I am in the same position with regard to this matter that Artemus Ward is said to have taken with regard to the question of the rebellion in which he was so deeply interested that he was willing to sacrifice all his wife's relations. We are dealing with No. 2, but at the same time this discussion we have been listening to seems to be taking in Nos. 2 and 9, of which I am the author—that

we earnestly petition the executive council of the province of British Columbia to take such steps as will lead to the enactment at the coming session of the provincial legislature of laws which will permit the government to lend assistance to irrigation projects in a similar manner and under similar conditions to those under which they render aid to railway projects.'

The water does not belong to the individuals, the government, or corporations, it belongs to the spirit of the empire. That is the spirit that is governing all the British empire to-day. What are we asking for in this resolution? Simply that the government see that the water belonging to the Crown be fairly distributed. That is all any one asks, that is all any one has any right to ask. It was my pleasure and privilege and benefit to be in Wyoming during the early working there of the irrigation system, and any man who took water from his neighbour even though he had a priority was liable at any time to encounter the shotgun. Such things should not be admitted in civilized countries but they do exist.

Everybody knows, and I think I speak representative of every sane reasonable thinker, that the land in the interior of British Columbia without water is practically useless. I take it, after having looked over the ground very thoroughly, that water is more valuable in British Columbia than its minerals, its timber, than any of its other resources. British Columbia is favourably situated in every respect as far as the soil and the other accessories go, and if you can only put the water on the land you can get any price for the land. In the country south of us they are now selling land that is exactly similar to the land around Kamloops and in the Okanagan for \$1,000 an acre and there is reason, in fact I think there is practically every reason, for the country in which we are now living to become as valuable and possibly more valuable than these countries to the south of us.

In British Columbia, I have made the statement before, at the head of nearly every creek there are lakes ready at hand for storing water and what would result if we could get water stored in all these lakes? The transformation, the change to this country would be marvelous. The forests that have been devastated during the last century would be resuscitated. Navigation which is now precarious would become a settled question. The stored water in these lakes would develop enough water-power, on the Fraser river alone 2,000,000 horse-power; greater by far than all the mines. I think it is safe to say that there are easily 1,000,000 acres of land still to come under irrigation when this storage has been carried to perfection. However, I am speaking ahead of my subject.

Dr. DICKSON.—Mr. Chairman and gentlemen of this convention: I think you will agree with me that what we are trying to get the government to do, what the conventions wants to get, is the most satisfactory solution of the problems that we realize are confronting us to-day. I would like to reply to one or two of the statements that have been put forward. Mr. Pooley stated that government ownership and control would stop private enterprise. I cannot see the full bearing of that remark. If we get a sufficient water supply to irrigate all this land which is now utterly useless, what greater benefit can accrue to the community than the millions of dollars that would be brought in by the new settlers coming in, and the greater productions that would be put on the market.

The question of socialism has been very ably dealt with. Another remark was that it would take the government five or ten years to carry through the advocated scheme. If it would take the government five or ten years to put through the scheme that will cover all the land that is suitable for irrigation, how long will it take private enterprise, taking a little dab here and little dab there? Supposing it does take five or ten years, I do not agree that it will, the government has its engineers out, the government is not asleep, the government is looking into all these things at the present moment, and they would be prepared within a short time, if they adopted this policy, to go ahead, and that is what we want.

Mr. BURRELL.—It seems to me that this resolution and Nos. 3 and 9 could have been in some way amalgamated or modified, to bring out clearly the meaning. The question has been raised, and I confess I think it was justified, as to whether it was the intention of the resolution to ask for government ownership or only government control. If the resolution intends that the government should own all the water in British Columbia I do not see how I could support it, but if it intends to ask the government to take steps to assist to solve some of the questions that are confronting us at the present time I then would be pleased to support it. I am not very much in sympathy with trying government ownership. That will effect the cancellation of private rights. But neither do I sympathize with the gentlemen who expect the government to jump in and do all the work, who expect to get free water and the rest of the country pay for it. Personally I think government ownership would be unfortunate. Neither do I think we should accept the resolution if it intends the wholesale ownership by the government of the waters of British Columbia. I do not think the movers intended that. I think they intended to ask for a fair and equitable distribution according to the Water Act. of the supply that nature has given. I also have had some doubt as to who owned the water. I have now learned that it is the 'spirit of the empire.' I would like to see the three resolutions Nos. 2, 3 and 9 amalgamated in such form as would be acceptable to the convention.

Mr. A. E. HOWSE.—Mr. Chairman and gentlemen: It occurs to me we are doing a great deal of rambling. We have a law on the statute books regarding municipalities, whereby a village, by a vote of a certain number of the owners of property, can request the government to incorporate it into a municipality or a city. The Act could be framed in such a way that a community wishing to have a storage basin in their community could do so by a certain number of property owners getting together and carrying the vote. I am living in Nicola where a large section of land is not under irrigation. There is a large supply of water, but no means of conserving water and we cannot get the company to do it. If we had a law on the statute books which would provide for the government at the request of the people of the community, putting in a water system and charging so much an acre, and assisting in carrying the expenses, there are several thousand acres that could be brought under cultivation. That is a question of government ownership in so far as they are giving us that privilege to put in that water system. We are willing to pay for the privilege and have that water, and I do not think we need have any great fear or any necessity for fear that the government will pass any legislation whatever that will be detrimental to the people of this province.

Mr. BURRELL.—I would like to move an amendment to this resolution, that this resolution and Nos. 3 and 9 which each bear more or less on government ownership, be referred back to the resolution committee, who, with the assistance of the mover and seconder of these resolutions should be authorized to frame a joint resolution.

Mr. PEARCE.—As far as No. 3 is part of this resolution, it does not propose government ownership more than in the making of reservations necessary for reservoir sites and it is not assumed that government sites—

Mr. BURRELL.—It says also to 'acquire.'

Mr. PEARCE.—Not those that the government does not need, only those which could be used as reservoirs. I am very familiar with the subject of reservoir sites, on the eastern slope of the Rocky mountains and also on the western side of the main range and on the eastern slope of the Selkirks, and 95 per cent of these sites are now owned by the government but if we do not take immediate steps it will be very difficult and expensive to reserve those in our railway reservation. If we let railways take possession of the sites it is going to be a very difficult and expensive matter to get them again. Any one who has followed this subject of securing our reservoirs or water sites will know that the United States has been in the last few years reaping the benefit of those reservations of sites that were made many years ago, and I want to urge on our government the advisability of the reserving of reservoir sites. They have done it to a certain extent but not nearly far enough.

Mr. GILLESPIE.—I want to second the motion made by Mr. Burrell in regard to these three resolutions. I do not see why the idea should not be embodied in one resolution.

The CHAIRMAN.—I have been looking over these and it hardly seems to me that No. 3 and 9 conflict. It seems to me that if you pass No. 3 you cannot pass No. 9. In the one you are asking that the government take steps for government ownership and in the other you ask that the government subsidize private companies and I can hardly see how the two can be amalgamated unless it be in an alternative way. if you move to refer it back to the committee in that way possibly the two can be combined but it seems to me that if the one is passed the other will have to go by the board.

Mr. BURRELL.—My only suggestion was to save time and to do away with an acute controversy.

Mr. POOLEY.—I move that Mr. Burrell meet with the resolution committee now and that we have Prof. Etcheverry's paper.

The CHAIRMAN.—The intention was that we would have Prof. Etcheverry's paper this afternoon. I told him I would call on him between 4.30 and 5 and I intend to proceed with the resolutions until about that time but the discussion of this resolution has been so protracted, and perhaps I should not have allowed the speakers to take so much time.

It is moved or amended by Mr. Burrell, and seconded by Mr. Gillespie, 'That this resolution and Nos. 3 and 9 be referred back to the resolution committee with instructions—'

Mr. BURRELL.—I might change my amendment that No. 3 be left out of that.

The CHAIRMAN.—I have heard Mr. Pearce speak on this matter before and I think that No. 3 can be passed with practically no opposition or discussion.

Mr. BURRELL.—In Mr. Pearce's resolution why use the word 'acquire', why not the word 'hold.'

Mr. PEARCE.—I might say that a reservoir site might have its value impaired by private ownership. In southern Alberta there was a valuable reservation which covered 17,000 acres. In that site there were some 300 acres that were owned by private persons and if they had not been acquired, the 17,000 would not have been worth anything as a reservation.

The CHAIRMAN.—Then I take it that your amendment is, that 2 and 9 be referred back to the resolution committee.

Mr. SMITH.—I cannot help thinking that it is a mistake to mix up these resolutions. As I gather it, the object of the mover of the second resolution is to secure a fair and equitable distribution of the water. That is the whole thing in a nutshell, and is an anticipation of unfair treatment by the interference with first rights by government ownership. Now government ownership in its bald sense is rather a bogey that has a tendency to alarm people, and I think this resolution could be very well amended so as to really convey the wishes of the mover and seconder and do away with the objections of the other gentlemen.

I would suggest that we strike out the last five words in that resolution and they are 'according to the Water Act,' leaving the resolution like this: 'Be it resolved that it is the opinion of this convention that the government of British Columbia should take steps looking towards the introduction of a water system in the irrigation of the dry belt to insure conservation and fair and equitable distribution.' That leaves the whole subject of how it is to be done to the government, it leaves the government to work out the details as to the best methods for obtaining that end. With your permission Mr. Chairman, I beg to move the amendment to the amendment as I have just stated.

Mr. CURRIE.—I would be glad to support that as that is the Water Act.

The CHAIRMAN.—Is there a seconder for it. The motion before the convention is that Nos. 2 and 9 be referred back to the resolution committee. All those in favour signify. Carried.

Mr. HAWKS.—I would request Mr. Martin Burrell to second the resolution No. 9.

Mr. BURRELL.—I must decline to second it as I have already spoken at some length—

Mr. ASHCROFT.—May I request you Mr. Chairman to ask Mr. Burrell to act on the committee?

The CHAIRMAN.—The resolution committee asks that Mr. Burrell act on the committee—

Mr. SMITH.—Might I rise to ask how you can refer a resolution back to the resolution committee when it has not yet been before this convention.

The CHAIRMAN.—Strictly speaking that is not in order but it will facilitate business very much.



White Valley Irrigation and Power Co., Ltd., Vernon, B.C. Moulding concrete slabs for sides of spillway.

## RESOLUTION No. 3.

*Moved by Mr. Pearce, Seconded by Mr. Currie.*

'Whereas the universal experience in all countries in which irrigation is practised shows that without storage only a small percentage of the value of the water that may be made available is obtained;

'Therefore be it resolved that the government of the Dominion, and also of the province of British Columbia be urged to push forward with all speed the investigation necessary for selection and reservation of such sites as may be under the said governments' control; also to acquire those not so owned or controlled, thereby forestalling as far as may be possible the creation of vested interests which may cause the financial impossibility, and in any case would add immensely to the cost, of such storage sites.'

MR. PEARCE.—I was congratulating myself that this was a resolution over which there would not be any controversy at all. But it would appear that the words 'also to acquire those not so owned or controlled' are not favoured by all. They need not give rise to very much of a controversy. To render a reservation capable of producing its maximum, it is found necessary in some cases that it should be acquired, so as to render this storage property the value it would be if it were so owned. I have a case in mind, the Devil's Head lake, at Banff. We desire to render the natural storage property at that point one of the greatest storage properties we have on the eastern slope. There are two lots owned by private individuals and we will be very fortunate if we get the one property for \$600 and the other for \$500. Then there is Lake McGregor. Any one who has at all looked into the question of storage must know that if we are to utilize the water of this country for irrigation purposes, storage is absolutely necessary. Up to the present time 99 per cent of the storage basins on both slopes of the Rocky mountains are in the hands of the government, either the Dominion or the provincial, and all I have in view in this is that the government should follow the example set by the United States many years ago; and that they might take such steps looking toward the water supply of the country they would require information with a view to setting apart these basins, and the great strides the United States irrigation schemes have been able to make in the last five years have been on account of the action taken before. I have in view a point in the Rocky mountains where already two railways are going through, and if those railways are allowed to choose their own sites, they will render that storage absolutely valueless. We have not, on the eastern slope of the Rocky mountains, one quarter enough water for the land that we require and therefore it is necessary for the government to look to this before it is too late. Some years ago you probably followed the contest between the governments of Mexico and the United States regarding water rights on the Rio Grande. The engineers of the United States pointed out that there was a most valuable water site that could be utilized by the United States, but it was rendered very expensive because it was in the control of the railway and would cost £7,000,000 to expropriate. It was pointed out that if it had been foreseen at the time the railway was planned, it would not have cost more than \$200,000 or \$300,000 for the railway to have located elsewhere. That is what is likely to happen on our east-slope of the Rocky mountains. This is a matter that I have been urg-

ing on the government for several years, and at one time it was taken up, but afterwards, with the development that has been made by us as private individuals, the government seemed to lose sight of it. I think the time is now most opportune to at least bring it to the attention of the Dominion government. The same thing is true to some extent in regard to the action of the provincial government in the providing of water rights on the Rocky mountain range, in the Kootenay and also on the eastern slope of the Selkirks and I hope this resolution will receive the hearty endorsement of this convention.

Mr. CURRIE.—I wish to second the resolution. I think that it is a good thing to have.

Mr. DRAKE.—I wish to call the attention of the convention to that portion of Mr. Pearce's remarks to the effect that the government has apparently lost sight of the question. It is true there was an interval of several years in which no further action was taken by the Dominion government but last session the Minister of the Interior introduced a Bill amending the irrigation law and giving the Dominion power to acquire such lands as might be required for reservoir sites within the irrigated belt, by purchase or otherwise and to dispose of them as it might see fit. I am familiar with the McGregor lake case cited by Mr. Pearce. There are some 18,000 acres, most of which was Dominion land, but there were several hundred acres of it that were owned by private individuals and several hundred more that were entered as homesteads. It was absolutely impossible for any use to be made of the site until this Act was put through and authority obtained to purchase the land that had passed from the Dominion. The sum of \$50,000 was appropriated to acquire these lands.

Resolution carried.

#### RESOLUTION No. 4.

*Moved by Mr. Thrupp, Seconded by Mr. Spiers.*

'Resolved, that any irrigation or power company working under a scale of rates authorized by the Dominion or provincial governments should not be permitted to have the same increase, without all parties having due notice and opportunity to be heard in the matter.'

Mr. THRUPP.—This resolution as put forward by the committee is not quite in the form I sent it in, and I do not quite know what the powers of the committee are to amend resolutions before they come before the meeting. I would like to have you explain to us on what ground the committee are expected to act in that matter. The resolution I put in went a good deal further than it stands on the paper. Can I have some explanation of that point?

The CHAIRMAN.—The purpose of the resolution committee is to investigate all resolutions and to put them in such shape as they think they should be brought before the convention, but I will ask the chairman of the committee to explain their reason for making the alteration.

Mr. ASHCROFT.—Mr. Chairman, and gentlemen: The object of the resolution committee is, I take it, to see that no resolutions come before the convention, overlapping if possible, and to alter the wording if necessary in bringing it before the convention.



The resolution as it reached us was a lengthy article and we found it necessary to abbreviate it somewhat.

Mr. THRUPP.—As far as the wording is concerned I have no complaint to make to the committee, but they have cut out a portion that was rather important. I do not know if I would be in order in moving the resolution as it was originally sent in, or if the rules of the convention allow only what was passed by the committee.

The CHAIRMAN.—I take it any amendment can be moved before the convention. It is rather a new problem.

Mr. THRUPP.—The question arose in one of the earlier resolutions and the committee said they altered it because they did not have, or did not understand, the Bill (No. 187).

The CHAIRMAN.—I have not got a copy of the constitution before me so I cannot say what is provided. I do not know why the amendment should not be moved before the convention. It will have to come as an amendment I think.

Mr. THRUPP.—Does that mean that someone else has to move this first and then afterwards I can move the amendment.

The CHAIRMAN.—That is what was done with the other resolution referred to.

Mr. THRUPP.—Is it competent for me to move this first and then move the amendment.

The CHAIRMAN.—Well——

Mr. THRUPP.—Under the circumstances I will move it as it stands printed on the paper. Under section 310 of the British Columbia Water Act, the Lieutenant-Governor in Council has a right to change the rates charged by the irrigation companies. The point I wish to emphasize in this resolution is that before he exercises that right a public inquiry should be held. Under section 320 and following sections, he also has power to hold those inquiries and I wish it to be enacted by amendment of this that public inquiry will be held so that both sides can be heard and the whole matter threshed out by the Lieutenant-Governor in Council, and his decision given. It is a very important matter and the government may decide at their own discretion what is in the public interest, but unless they have heard both sides I do not think they are in a position to pass an opinion.

Mr. SPIERS.—I second the motion. I am glad to be at a convention like this. I think it a grand thing for one part of the country to help the other out as much as they possibly can. Every part of the country is different. I think when we come together as a body like this we should study each other's difficulties and try to help them out all we can. Maybe what pleases me does not please you a bit. I told this gentleman I would second his motion and I think the people should have a say as well as the Lieutenant-Governor in Council, or otherwise the companies could raise their rates before the people knew anything at all about it. I think that is what the conventions are for, to help one another out and if that is the case I think the Act should be amended so as to let us have a say and know what the Lieutenant-Governor in Council is deciding upon.

Mr. SMITH.—In the resolution it says ‘any irrigation or power company working under a scale of rates authorized by the Dominion or provincial governments should not be permitted’—not be permitted by whom? It does not say who it is to be permitted by.

The CHAIRMAN.—There is provision in the Water Act for the approval and ratification of these by the Lieutenant-Governor in Council. The intention of this resolution, as I understand it, is not to question the scale as first approved by the Lieutenant-Governor in Council, but that it shall not be allowed to have them increased without the public being publicly notified of the application for the increase so that they can be heard.

Resolution unanimously carried.

The CHAIRMAN.—I might state it is the intention to go on with the resolutions until some time about 4.30 and then ask Prof. Etcheverry to give his paper. I understand it is somewhat introductory to his lecture to-night and after his lecture to-night we can go on with any resolutions that have not been dealt with.

#### RESOLUTION No. 5.

*Moved by Mr. Latimer, Seconded by Mr. Palmer.*

‘Whereas under section 223 of the Water Act, power is given to any licensee to enter upon, use and occupy the lands of others;

‘And whereas in actual practice it is found that this section does not apply to Indian reserves;

‘Therefore, be it resolved that the provincial and Dominion governments be requested to take the necessary steps to place all lands in the same position as regards said section 223.’

Mr. LATIMER.—The whole question is this, that in the construction of irrigation works the Act gives a person the right to enter upon lands, but it has been found in the course of practise that it does not work as regards Indian reservations, and the purpose of this resolution is to ask the government to take the necessary steps to put all on the same footing. I think it is apparent to most of us that it is a resolution that should be passed.

Resolution carried unanimously.

#### RESOLUTION No. 6.

*Moved by Mr. Fairfield, Seconded by Mr. Jamieson.*

‘Whereas sufficient rainfall lies at the root of successful agriculture in Alberta and British Columbia, and it is of the greatest importance that an accurate record of the rainfall of his district should be available to every farmer;

‘Therefore be it resolved, that this convention ask the director of the Meteorological Service to supply a sufficient number of observers with rain gauges as to insure an accurate record of the rainfall of every district being obtained.’

Mr. FAIRFIELD.—I will not inflict any lengthy argument on you, but while I am on my feet I might point out that this resolution has a direct bearing on the question of irrigation. In the province of Alberta and in a good many districts of this province the rainfall is recorded, although in the province of Alberta (I speak of Alberta as I am more familiar with conditions there than with those in this province), farming operations are carried on practically without the aid of irrigation, to a greater or less extent all over the province, but we find there are certain localities where irrigation may be employed with profit. The rainfall there is one of the problems. One of the irrigation questions in that province is to know where to use the water and when to use it and how much water to use. The rainfall in the various sections varies. There may be a good crop in one district and twenty-five miles away the crop may be burnt up. The farmers have had very little chance to know what the rainfall has been in the past, as the country is new. From the farmer's standpoint, if the farmer is to solve these questions he needs this data and we need a great many more meteorological stations than we have at the present time. There is sometimes one hundred miles between stations and it is necessary for the farmer, if he is to farm intelligently, to have some idea of the amount of rainfall he can reasonably expect. We have with us Mr. George Harcourt, the Deputy Minister of Agriculture of Alberta and I would make the suggestion that he be asked to make a few remarks on this subject.

Mr. GEORGE HARCOURT.—I do not know that I have a great deal to say as to what the rainfall is in various parts of the country. The Department of Agriculture took up the subject with the Meteorological Service and we have now some sixty or seventy sub-stations taking the different reports and making it known what amount of rainfall there is in particular districts. There are five or six that report daily to headquarters and the others only make a monthly report and if we could issue a monthly bulletin, showing what there has been for the previous month or previous year, and from the beginning to date of that month, it would give the farmers a good deal of information, so they would know where they were at, and it would be of interest to those of you who are following irrigation. As Mr. Fulton said yesterday, with some of them they only got 5 inches of rain this year. If it had been possible for them to have known they would only get 5 inches of rain, or were likely to get only 5 inches of rain, they would not have sown, for every one would have known there was not sufficient rainfall the previous year to get a good crop. The use of augers is very useful. We use them to bore the soil to find out the depth of moisture. Prof. Inchfield said that where advisable the farmer should give one and one-half years to learn thoroughly how to bore for water. However, whether that is a little long or not, we can get, in this way, what the rainfall had been the last year, and knowing what it had been the last year, if a fellow knew that he only had 2 feet of moisture before he struck dry ground he would know he had better not sow the crop. All these principles are going to show people the amount of water to use or not to use. You will have to remember of course that water will have to be used, although you will have a better knowledge of the amount of water you should apply to the land, and I think it is of the greatest advantage, not only in Alberta but to you, to have rain observatories placed all over the province so that you can get a correct idea of the amount of rainfall.



The Intake, Southern Alberta Land Co., Ltd., Canal. Five steel gates, each 8 feet high by 10 feet wide.

Mr. BURRELL.—I want to express my sympathy with the resolution. There is one point I would like to speak about. I think the government would be justified in giving a small fee to the men who carry on this work. They should have a fee or remuneration to some extent otherwise there are some men who go away for a while and perhaps miss one small period and practically the value of those records is lost. If the government gave a small fee they would see that someone else was there to attend to the work if they went away.

Mr. LAWRENCE.—I would like to tell you an incident, one that occurred only a week ago. It was yesterday week that two learned professors from Poland came under the auspices of the British Columbia government to lecture. I am glad to know that the Deputy Minister of Agriculture, Mr. W. E. Scott, is here. We, together with these learned professors, went to Rose Hill, a distance of about six or eight miles out of Kamloops, that they might tell the settlers things pertaining to agriculture. As we went along the road we came to a very poor patch of rye and Mr. Scott said, 'That will never pay for cutting; are all the crops like this?' and I said, 'I hope not.' We went on, and came to a very poor patch of potatoes, a very poor patch indeed, and I began to feel downhearted for the credit of the district and for the sake of the settlers. Well we went on a little further and came to another patch of potatoes, a large patch of potatoes, and those potatoes were standing up 2 feet high and in full bloom and looking about as healthy as you wished to see them.

Professor Thorburn got out of the rig to see what was the cause of it and he said, 'If I am right there is moisture for 4 inches below the surface.' And sure enough he scraped back the dirt and for 4 inches he had moisture and it was carrying that crop of potatoes through. We went on further and came to a poor piece of wheat on one side of the road and a good piece of wheat on the other side of the road and the professor said, 'You may depend upon it, the rainfall this year in this district all fell on the one side of the road,' and I wonder if the people have been wondering why the good crops were all on one side of the road.

When we got to the schoolhouse he said to the men gathered there, 'you have come here for information and first of all I want some information from you,' and he asked: 'What is the altitude,' and none of the farmers there could tell. He then asked what was the annual precipitation, and no one could tell him that, and he said that that was the first thing a farmer should know when he locates in a new district (I may say that district is only six years old.) A man should inquire what is the annual precipitation, and on his knowledge of that should depend his method of farming. He said, 'I knew when I came along the road you did not know what the rainfall was or you would not have been farming with the old methods of Ontario where there is plenty of rain. The methods you have been carrying out here would insure good crops in Ontario, but they will not insure good crops in the semi-arid district, and he emphasized the point that you should know the amount of rainfall and then adapt your methods accordingly.

Resolution carried.

#### RESOLUTION No. 7.

*Moved by Mr. Martin Burrell, M.P., Seconded by Mr. R. M. Palmer.*

'That this, the fourth annual convention of the Western Canada Irrigation Asso-

ciation, heartily endorses the establishment of a Canadian national apple show as one of the most effective means of demonstrating to the world the fruit-growing possibilities of the Dominion of Canada in general and British Columbia in particular;

'And it is further resolved that we urge fruit growers and all others interested in the fruit industry, to co-operate in making the first Canadian apple show, to be held in Vancouver, B.C., October 31 to November 5 next, an unqualified success and a credit to the Dominion of Canada.

Resolution unanimously carried.

The CHAIRMAN.—Before I call upon Prof. Etcheverry you will notice on the programme a paper by Mr. E. F. Drake of the irrigation branch of the Forestry Department, Ottawa, which was to have been given this morning, and for this afternoon a paper by Mr. P. M. Sauder, Chief Hydrographer of the Forestry Department, Ottawa. I did not call on Mr. Drake this morning and I am afraid I will not be able to call on Mr. Sauder this afternoon. I do not want them to feel that I do not want to call on them. It has been explained to the convention that Prof. Etcheverry is called upon now because his paper which he is to give this afternoon is introductory to his lecture this evening. I hope there will be time to call upon them before the end of the convention, but if not I understand they have papers prepared which will be printed in the report of the convention.

The Chairman then introduced Prof. Etcheverry who read the following paper:

#### PROF. ETCHEVERRY.

Before taking up my paper I want to thank your committee, and to thank you all in allowing me to come from California. I not only appreciate the opportunity given me of telling you about our California irrigation but I appreciate the opportunity of meeting you and getting acquainted with you and with your country. I would have hesitated to come here and give you our experiences had I not done some work in eastern Washington and Oregon and had I not visited the country before, so that I did not feel a total stranger to the district. In choosing my subject I thought a good deal about what subject I should discuss. I thought about the duty of water, the question of alkali and drainage, but I am glad I did not as I see you are not so much troubled about alkali and drainage as we are in our country. The subject I have chosen is of value not only to the people of British Columbia but to the other provinces where large irrigation systems are partly similar to irrigation systems in our own country.

#### THE ECONOMY OF THE PREVENTION OF CONVEYANCE LOSSES OF IRRIGATION WATER, AND THE USE OF CONCRETE FOR THE ECONOMICAL CONSTRUCTION OF IRRIGATION STRUCTURES.

Mr. President and delegates to the convention,—It was with great pleasure that I accepted the invitation to come from California to present a paper to this body; not only does it give me an opportunity to give you some information which I hope will be of value to you in solving your irrigation problems, but it permits me to become

better acquainted with you and your rapidly developing country which has become the home of many of the best citizens of the United States.

While this is only my second trip to British Columbia, I have during the past year taken two other trips in the arid region of the Northwest of the United States. My first visit to British Columbia was a short one last May when I had occasion to examine the Fruitlands project, across the river from Kamloops. From this examination, as well as from a general view I had of this part of the province, I was impressed of the similarity of your country with some portions of eastern Washington, and so I do not feel a stranger to your irrigation conditions.

I have selected for discussion topics which I believe are of general interest to those engaged in irrigation work. In the first part of my paper I shall discuss

#### SEEPAGE AND EVAPORATION LOSSES IN THE CONVEYANCE OF WATER, AND THEIR PREVENTION.

All irrigators are well acquainted with the fact that the losses in conveying water in earth canals are in many cases very large, and with newly excavated canals, are often so great that it is difficult to deliver any water at the lower end. The water lost by seepage disappears through some underground channel below or raises the water table of the lands adjacent to and below the canal. This causes either the waterlogging of the land or the accumulation of alkali salts on the surface. This effect, combined with wasteful irrigation, has been the cause of over ten per cent of the irrigated lands of the west becoming unfit for crop production. These damages alone, in many cases, justify the expense of lining the canals. This was forcibly brought to my attention on a private project which I visited in the Yakima valley in eastern Washington. Although it had been in operation only one season, a large percentage of the land had become waterlogged. To remedy this, several miles of concrete lining and the improvement of drainage were recommended. The lining has recently been constructed and will no doubt prevent the waterlogging to a large extent.

But even if these damages to the land are neglected there are many localities where water is sufficiently valuable to make the lining of canals to prevent the loss of water a paying business. The amount of money which one is justified in spending will be in proportion to the extent of the losses, which depends on local conditions such as porosity of the soil, the size of the canal, the number of seasons the canal has been operated, the amount of silt in the water, the velocity of flow, the form of cross section, the depth of water table, &c.

The most valuable general observations as regards the amount of these losses, are those of the Irrigation Investigations Bureau of the United States Department of Agriculture. From series of measurements on seventy-three ditches in the Western States, they have found that the average loss per mile of ditch is 5.77 per cent of the entire flow; the measurements range from a maximum of 64 per cent per mile to a slight gain in a few cases. Large canals in general lose less in proportion than small ones. The measurements show that the loss per mile averages about 1 per cent for canals carrying 100 cubic feet per second or more; about 2½ per cent for canals carrying 50 to 100 cubic feet per second, 4½ per cent for canals carrying 25 to 50 cubic feet per second, and 11½ per cent for canals carrying less than 25 cubic feet per second. (And I believe nearly all your ditches would be included in these small canals.)

These losses include seepage and evaporation, but contrary to the general belief, the losses of evaporation are insignificant compared with those of seepage. An unusually large rate of evaporation is half an inch a day and is only reached occasionally. In the San Joaquin valley, in California, the mean evaporation measured for the hottest month was .37 of an inch in 24 hours. Seepage losses are usually greater than 1 foot in depth per 24 hours and usually average not less than 2 feet. These losses are 25 to 50 times the maximum evaporation of  $\frac{1}{2}$  inch per day. A good illustration is obtained from measurements and computations made on one of the largest systems in the San Joaquin valley. The total length of canals is 165 miles; the average evaporation loss was .9 of 1 per cent of the flow diverted, while the total seepage loss was 28 per cent or 30 times greater than the evaporation losses. These and other numerous experiments show the evaporation losses in the conveyance of water are so small as compared with the seepage losses that they are of no importance.

To prevent the loss of water in conveyance, lining the canals with different kinds of materials has been tried. Those used or experimented with are; concrete, wood, asphalt, oils and clay puddle.



Concrete lined canal, Santa Ana Valley Irrigation Company, California.

A good lining should fulfil the following requirements; it should be water-tight, prevent the growth of weeds, stop burrowing animals, be strong and durable and not affected by frost or the tramping of cattle. A few years ago I had the opportunity to investigate for the government the different types of canal linings in California and to make experiments to determine their watertightness. From these and from more recent experiments, I believe the following results can be anticipated:—

1. A good oil lining constructed with heavy asphalt road oil applied on the ditch sides and bed at the rate of about three gallons per square yard, will stop 50 to 60 per cent of the seepage.

2. A well constructed clay puddle lining is as efficient as a good oil lining.



3. A thin cement mortar lining about 1 inch thick made of one part cement to four of sand will prevent about 75 per cent of the seepage.

4. A first class concrete lining 3 inches thick, made of one part of cement to two of sand and four of gravel will stop 95 per cent of the seepage.

5. A wooden lining when new is as efficient as a concrete lining, but after two or three years, repairs and maintenance will become an important item and by the end of eight or ten years, it will necessitate complete renewal.

The cost of an oil lining where oil can be bought at California prices is about 1.2 cents per square foot. Cement mortar lining 1 inch thick costs about three to four cents per square foot. Cement concrete 2 inches thick costs about six cents, and 3 inches thick about 8 cents a square foot. The cost of clay lining depends greatly on the nearness of the canal to suitable clay. If clay is close to hand, it can be hauled and spread on the canal, then either tramped in by cattle or worked in by dragging chains over it, at a cost of less than 1 cent a square foot, but there are many localities where I have seen enough money spent on clay linings to put in a good concrete lining. Wooden lining has been used in very few cases and the cost of such a lining built of 2-inch lumber nailed on sills and side yokes will not be less than that of a 2-inch concrete lining and not nearly as durable.

The disadvantages of the cheaper linings are the following: An oil lining stops only a fraction of the seepage losses, and while it will resist erosion well, it probably will not prevent the growth of weeds for more than one season unless a high velocity is used and it will not stop the burrowing of gophers. Another objection is that suitable oil is often hard to obtain at a reasonable price. Oil linings have not been sufficiently tested to determine their durability. To my knowledge, the only examples are two canals and one reservoir in the San Joaquin valley of California and two reservoirs in Los Angeles. Clay puddles will not prevent the burrowing of gophers, and weeds grow rapidly, especially since the velocity of the flow must be small in order not to erode the lining.

A concrete lining has none of the above disadvantages and it meets the requirements of a good lining better than any other material. The only objection is its higher first cost. This, however, can be partly balanced, where a new canal is to be constructed by using a higher velocity and a smaller cross-section.

The earliest use of concrete linings was in southern California about 1880 when the increasing value of water made it necessary to do away with losses. Since that time practically all of their canals, which are comparatively small carrying usually less than 100 cubic feet per second, have been lined with concrete and in some cases replaced with concrete pipes. Until recently very little concrete lining had been done outside of that region, but during the last few years concrete lined canals have been constructed on many of the projects of the United States Reclamation Service and on numerous private projects. As example: The Modesto system in California has lined portions of its main canal, 64 feet wide at the top and 5½ feet deep, with concrete lining 2½ inches thick. The Lower Yakima Irrigation Company of eastern Washington has completed seven miles of concrete lining. The Burbank Power and Irrigation Company, also of eastern Washington, has recently constructed one mile of concrete lining. There are also numerous examples in California, Oregon, Nevada, Idaho, and other states.

While there are many ways to build the concrete linings, they are generally constructed according to two methods. The first method is used where the side slopes of the ditch are flatter than 1 to 1; the second method is used for steeper side slopes.

To construct linings according to the first method, the canal is trimmed ready to receive the lining, then the mortar or concrete is spread on the sides and bottom and plastered on in a manner similar to sidewalk work. To obtain the right thickness guide strips are used. The thickness ranges from  $\frac{3}{4}$  of an inch up to 3 or 4 inches.

To construct the lining according to the second method, the canal is first trimmed, then the wooden form for the side lining is placed in position and the concrete mixture poured or thrown in the space between the form and the sides of the earth ditch. For canals less than 10 feet at the top, usually the form is a wooden trough made of the same cross-section as the finished concrete-lined ditch. The thickness of lining is usually from 2 to 6 inches.



Concrete section replacing wooden bench flume, Modesto Irrigation District, California.

The very thin linings of 1 inch or less have been used extensively on many systems of southern California and have been very satisfactory. As an instance, the Gage canal has been lined with  $\frac{3}{4}$ -inch of cement mortar for almost its entire length of twenty miles. After ten years of use, during the last four years of which water was run continuously giving no opportunity for repairs, the total cost to repair thoroughly all sections was for these four years less than  $\frac{1}{2}$  of 1 per cent. There is no doubt in my mind that such thin linings, while helpful, are not strong enough to be satisfactory, especially where the extremes in temperature are as great as in the Northwest. There is only one example to my knowledge of a thin lining built in a region where the ground freezes. That one is in eastern Washington where four miles of canal were lined with a lining varying from  $\frac{1}{2}$  to  $1\frac{1}{2}$  inches thick. When I examined the lining, I found it rather badly cracked, but because of poor workmanship it was impossible

to state how much of the cracking was due to frost. Although this lining was not in my opinion very satisfactory, it was, nevertheless helpful in preventing seepage losses, for before its construction it was impossible to carry water over this stretch without losing most of it.

As a guide for the proper thickness for concrete linings in the Northwest, I would recommend usually not less than 2 inches for small canals and preferably 3 inches. There are many localities where 3-inch concrete linings have been used and with entire success, even where subject to frost. No matter what the thickness is, unless the concrete is reinforced with steel, or expansion joints provided, cracks are to be expected. These cracks will usually be fine cracks occurring at more or less regular intervals and the leakage through them will be small, the cracks often silting up. For better appearance and also to distribute the cracks at uniform intervals, the lining should be laid in sections 6 to 8 feet long.

To decide intelligently what canals should be lined with concrete and to know what expenditure is justifiable, it is necessary to know the extent of the seepage losses and the value of the water which is lost, also the damages done by seepage water. If the value of the water only is considered then one is justified in expending for the improvements of the canals by lining a capital whose interest added to the depreciation is equal to the annual value of the water loss. Accompanying benefits are the prevention of land waterlogging, the minimum danger of breaks and the prevention of damages to crops because of interruption in flow. As an instance, if a canal carrying 100 cubic feet per second loses 1 per cent per mile by seepage, the water lost in one irrigation season of five months is 300 acre-feet per mile of canal. This water represents a value of \$450 on a basis of \$1.50 an acre-foot (that is one acre 1 foot deep). To save this water we would be justified in spending a sum whose interest added to the depreciation is equal to the above sum. As depreciation on a good concrete lining and interest would not exceed 7 per cent, the value of the water lost would represent an investment of \$6,400 per mile. Since a 3-inch concrete lining for a canal carrying 100 cubic feet per second could be constructed for \$6,000 per mile, the above sum is more than sufficient.

The assumed seepage loss of 1 per cent is often exceeded with small canals, and on most irrigation systems there are always some sections of canals which would warrant concrete lining. With the increasing price of water and with the development of water by storage and pumping, which is most always expensive, I believe the time will soon come when many of our irrigation canals will be concrete lined.

Concrete pipes for the conveyance of water, where the quantity of water is not large, have some advantage over canals. They do away with the road crossings which are necessary with canals, they do not occupy any land which is wasted; and they do not collect the dirt and rubbish that falls in open canals. They can also be used under light pressures and take the place of canals all in fill, or flumes on low trestles. The argument that they also prevent evaporation has not much weight for we have seen that the losses due to evaporation are negligible. These advantages have led to the use of concrete pipes up to sizes of 3 to 4 feet in preference to concrete-lined canals. This is the case with many of the canals and laterals of many of the irrigation companies of southern California. For large quantities of water the cost of concrete pipes is prohibitive.

Concrete pipes are especially valuable for the conveyance of small quantities of water over rough lands, but the largest use of them is for the smaller laterals of the irrigators. In southern California, hundreds of miles of cement pipe have been used for the distribution systems to prevent the losses in conveyance, to facilitate the distribution of water, and to prevent waste in its application to the land.

The measurements of the United States Irrigation Investigation Bureau show that the losses in conveyance are much greater for small ditches than for large canals.



Cement Pipe Distribution System for furrow irrigation, Southern California.

For this reason the largest losses are often in the ditches of the irrigator after he takes the water from the canals of the company. Other important losses are in the spreading of the water on the land, (that is in diverting the water amongst the furrows).

I shall not discuss the different methods of application to the land but will confine myself to furrow irrigation and show the economy of the use of concrete pipe

distribution systems over older methods. I do not intend to infer that it is the only method of irrigation to which pipe systems are adapted, for where water has to be handled in small heads as in southern California, it is equally well adapted to alfalfa and other crops.

Where furrow irrigation is practised, the crude method, which has been largely abandoned in southern California, is effected by means of an earthen ditch located along the higher boundary of the farm which carries the water to the upper end of the furrows, where an equal division between furrows is attempted through openings in one bank of the ditch or through iron or wooden spouts. This method requires constant attention and a uniform distribution is impossible. For this reason in many localities the earthen head ditch has been replaced by wooden flumes with one opening in the side of the flume for each furrow, the openings are regulated by slides or plugs. In southern California the short life of wooden distributing flumes and their leakage has led to the use of concrete flumes. These flumes are constructed by means of a specially designed machine or by means of wooden or metal moulds. In the side of the flume are cemented galvanized iron spouts, one for each furrow, and the flow is regulated by iron slides. These small flumes cost about twice as much as a wooden flume but their durability will more than offset the greater first cost.

The distribution of water in flumes over rolling ground requires that wooden flumes be used supported on stilts or trestles. These, as often constructed, are weak and will often blow down with every strong wind storm. Flumes also interfere with cultivation and harvesting of the crop. These objections have led many of the irrigators of southern California to use underground pipe distribution systems. A supply pipe is laid about 2 feet underground along the upper boundary of the tract and at the head of each row of trees the pipe is tapped and a stand pipe connected to it. The water flows out of the stand pipe into the furrows through spouts cemented in the stand pipe. Cement, wood and clay pipes are generally used. Cement pipe is more durable than wood pipe and is considerably cheaper than either; except where a clay pipe factory is in the vicinity and it has to meet competition. The cement pipe used in southern California ranges from 6 inches to 36 inches in diameter and is made of a mixture of one part of cement to three or four of sand or gravel, well tamped in metal moulds. The moulds are not expensive and the pipes are often made by the irrigator himself. As the large pipes will not resist pressure above 10 feet and the small ones not over 20 feet, for greater pressures wooden pipes or some other type of concrete pipe is necessary. I refer only to the hand-made. The cost of this type of cement mortar pipe as compared with wooden banded pipe is about as follows:—

Diameter.	Wood-banded pipe at Vancouver.	Cement mortar pipe. 1:3 mixture. Built on ground but not laid.
12 inches	385	20
14 inches	44	25
16 inches	55	30
20 inches	91	43
24 inches	1 21	60

In general the cement pipe cost about one half the cost of wood-banded pipe.

While pipe irrigation has until recently been limited to southern California, it has to my knowledge during the last few years been adopted for orchards in Oregon, Washington, Idaho, and no doubt other states and there are many localities where expensive wooden pipe and iron pipe systems have been installed where a cheaper and more permanent cement pipe system could have been built.

In the above remarks, I have attempted to present to you what I believe is the best solution for the prevention of water losses in the conveyance of water. The methods suggested may be expensive in first cost and no doubt there are localities where water is so plentiful and cheap that no improvements are necessary; but the remarkable growth of irrigation of the last few years has created such a demand on the water supply that the cheap sources have been mostly utilized. In future, water will be developed at a greater cost and because of the large area of arid land for which there is insufficient available water supply, the high value and scarcity of water will lead to the best form of conveyance of water.

For the second part of my paper I have selected

CONCRETE AND ITS RELATIVE ECONOMY AS COMPARED WITH WOOD FOR IRRIGATION STRUCTURES; MEANING BY CONCRETE, BOTH PLAIN AND REINFORCED CONCRETE.

While concrete and masonry have been the standard materials for irrigation structures in the older irrigated regions of foreign countries, the use of concrete on the irrigation systems of the United States was practically unknown until a few years ago, with the exception of southern California where concrete has been used during the last twenty years or more for lining canals, for cement pipes, for concrete distributing flumes, and for measuring boxes and other smaller structures. During the last few years and especially since the beginning of the work of the United States Reclamation Service in 1902, concrete structures are widely used not only on the twenty-five government projects located in fifteen states and territories, but on many of the new private projects. On some of the older systems wooden structures which have decayed are often replaced by permanent concrete structures. For instance, the Modesto and Turlock irrigation systems in California, are replacing many of the wooden structures with concrete as fast as they need renewal. This is also true of the Arkansas Valley Sugar Beet and Irrigated Land Company of Colorado which has done some very interesting reinforced concrete work; and of many other projects in the other states.

The obstacles which have in the past prevented the more rapid extension of cement, were its cost and the difficulties of handling it, as compared to the lower first cost of wooden structures which are easily erected by common labourers. The difficulties in the manipulation of cement are not serious. Now that concrete is so widely used in cities and on the farms, any observant careful person can, with a little reading and some practice, learn how to construct the simple structures. As regards its cost in comparison with lumber, the cost of cement has very materially decreased and it can be purchased for from \$2.50 to \$3 in most regions, while the price of lumber has advanced. Another reason for the increasing use of concrete for irrigation work is the rapid development and improvements in reinforced concrete construction which is well adapted for irrigation structures.

The one great advantage of concrete over lumber is its great durability. It is true that as a rule, the first cost of concrete structures is more than that of wooden ones, but almost invariably concrete is more economical. The difference in first cost is not as great as is usually supposed. A few general comparative figures based on facts collected from different projects will help to convince those who are still strong advocates of wooden structures.

Omitting the parts of irrigation systems already discussed, the structures most frequently used are: gates or turnouts or division boxes placed at the heads of ditches; measuring boxes, drops or falls used where the slope of the ground is steeper than the grade that can be given to the canal; pipe siphons and flumes to cross depressions and for side hill work; bridges and culverts.

As regards durability, the wooden structures can be classified into two groups. In the first group are those structures which are partly in the ground, which includes gates at the head of ditches, division and measuring boxes, drops, culverts, &c.; and in the second group are those which are all above ground such as flumes and wooden stave pipes either supported above ground or entirely underground. The life of wooden structures depends on the quality of lumber used, on the strength of the structure and the workmanship. For instance, a flume well built and with sufficient strength to prevent springing and settling, so that there will be minimum leakage, will last much longer than a weaker flume.

The short life of wooden irrigation structures is greatly due to the lumber being alternately dry and wet. The life of the structures placed in the ground is in addition shortened by the wood being partly in contact with moist earth, and will average six to eight years for pine and eight to ten years for redwood, when complete replacing is necessary. (Here I believe you use fir mainly.)

The annual cost of repairs and maintenance is usually about 5 per cent for the first three years and 15 per cent for the next four or five years, averaging about 10 to 12 per cent for the entire life of not over ten years. In addition to this should be added the cost of renewal which if distributed over ten years will amount to 10 per cent per year. The life of well constructed redwood flumes and of wooden stave pipe is greater and may be as long as twenty years, but is usually twelve to sixteen years with practically no repairs the first five to eight years, but with considerable repairs afterwards, averaging not less than 8 per cent yearly for the entire life. The cost of renewal distributed over the sixteen years amounts to 6 per cent per year. If we assume the interest on the capital invested to be 6 per cent, then the total annual cost for the structures of the first group is not less than 26 per cent of the first cost and for the second group 20 per cent.

Concrete structures, if properly constructed, will last forever, but assuming depreciation and repairs at 2 per cent gives a total annual cost of 8 per cent as compared with 26 per cent for wooden structures of the first group, and 20 per cent for wooden structures of the second group. Based on these figures, concrete structures are more economical if their first cost is less than three and a quarter times the cost of wooden structures of the first group and two and one-half times the cost of wooden structures of the second group. However, the actual cost of many concrete structures is much less than would be given by such ratios and is often only a little higher than wooden structures. This is especially true of concrete structures built partly in the ground

for they require only simple forms and when these forms can be used over many times as where several structures of the same size are required, the cost is greatly reduced. For illustrations: on the Orland project in California, the average cost of several small drops was \$32.82; the estimated cost for a wooden structure of the same size is \$27.94 or 15 per cent less. The average cost of sixty concrete turnouts was \$25.50 as compared with \$19.80, the estimated cost of wooden turnouts or 20 per cent less. On the University farm at Davis, California, a concrete check gate cost about 50 per cent more than wooden ones. The Arkansas Valley Sugar Beet and Irrigated Land Company of Colorado have, during the last few years, constructed some very interesting reinforced concrete structures. The cost of two large reinforced concrete drops was \$131 per foot of fall and the corresponding cost of a series of substantial wooden drops was \$120 per foot of fall. The wooden structures were built in 1899, but in 1904 were in such poor conditions that the operation of the canal at full supply caused some uneasiness for fear of breaks, and they required complete renewal two years afterwards, making their life about seven years.

In a general way it can be stated that as a rough approximation, wooden structures built in contact with the ground, such as gates, drops, &c., will cost in place, including excavation and backfilling, from \$40 to \$50 a thousand. Small reinforced concrete structures of the simplest type will cost \$10 to \$12 a cubic yard, ordinary reinforced concrete structures \$12 to \$16 and elaborate structures with thin reinforced walls, \$16 to \$20. Usually a structure requiring 1,000 feet of lumber can be built with about 4 to 5 cubic yards of concrete and the concrete structure will cost from 25 to 50 per cent more.

With the structure of the second group, that is wooden flumes and wooden stave pipes, the comparison is not quite so favourable to concrete as with the other structures. This is because of their longer life as compared to the wooden structures in contact with earth and to the greater difficulty in constructing them of concrete. The cost per cubic yard of concrete is considerably greater, especially for flumes crossing canyons and deep depressions, because this requires expensive forms to support it during construction and some skilled labour. For that reason, the cost of concrete flumes may be as great as three times the cost of a wooden flume, in which case a wooden flume or a steel flume may be more economical, at least until the price of lumber increases. But there are conditions which will favour the use of concrete, for instance, the Modesto and Turlock systems of California have replaced all their old bench flumes, which aggregate several miles running on the side hills, by concrete channels formed by means of a wall on the down hill side, a slope lining on the uphill side and a concrete floor in between. This not only did away with the high cost of repairs and renewals, but has paid for itself in the additional security, because a break in their main canal has meant the interruption of delivery of water and has caused great damages to crops. As a rule, a concrete flume supported on columns should not cost over two to two and one-half times the cost of a wooden flume.

As regards reinforced concrete pipes compared with wooden stave pipes, several of them have been built by the Reclamation Service and a few on private projects and their first cost is generally one and one-half times the cost of wooden stave pipes. They are therefore more economical and should be used in preference. They are, however, limited to moderate heads. The maximum head to which they have been sub-



mitted successfully is about 100 feet. A large reinforced concrete siphon in Spain, 13 feet in diameter and 7 inches thick, is under a head of 97 feet. On the Umatilla project in Oregon, reinforced concrete pipes 4 feet in diameter, 3 inches thick, have been tested successfully for pressures equivalent to 100 feet heads. For even these moderate heads, careful work is necessary.

To summarize the above remarks it may be stated that in a general way, with the exception of some flumes, concrete structures will cost from one and one-quarter to one and one-half times the cost of wooden ones. Since the large annual cost for repairs and renewals of wooden structures makes it economical to spend for concrete structures, two and one-half to three and one-quarter times the price paid for wooden structures, in nearly every case a concrete structure is more economical and will cut the total annual cost of repairs, renewals, and interest, one-half.

Another advantage of concrete structures which I have not emphasized is the additional security obtained, which is worth considerable.

During the last two years, some doubt has been cast upon the durability of concrete because of its disintegration by the effects of alkali. So far all that has been published can be reduced to the following facts:—

1. Out of all the many concrete irrigation structures including those on the twenty-five projects of the United States Reclamation Service, constructed in thirteen states and territories, there are only two projects, one in Montana and one in Wyoming, where the failures of concrete structures have occurred. The only other recorded instances are some sewers in Montana and some concrete drain tiles in Colorado.

2. The disintegration seems to take place where the structures are in contact with strong alkali water of a peculiar composition and occurs where the water permeates the concrete mass and is evaporated leaving the salts in the pores of the concrete.

3. Black alkali seems to have no harmful effect and the disintegration is caused probably by only some of the white alkali salts. Wherever disintegration has occurred, the alkali salts are sulphates with magnesium sulphate predominant.

As against these few failures there are hundreds of examples of concrete irrigation structures where alkali has had no effect. Nevertheless, where the sulphates are strong, it is good policy to experiment on a small scale in those localities before works involving large amounts of money are built and to take all known precautions in the construction. At present the best known means to prevent disintegration are:—

1. To make the concrete as nearly impervious as possible.
2. To remove the alkali water where practicable, by drainage.
3. To use some cement which will be most resistant to alkali.

The Reclamation Service is now experimenting with the use of a special cement and the Geological Survey is carrying on a series of experiments which it is hoped will help to solve the problem.

Until recently the principles of economy applied to other business have been very little considered in irrigation construction work. The practice has been to build the project as quickly as possible at a minimum first cost and sell the lands, and very little thought given to maintenance. The excellent work of the Reclamation Service during the last few years, has been an incentive to good construction and has improved the character of the works constructed on many irrigation systems. Irriga-



Sosa Reinforced Concrete Siphon, Spain. Twin pipes 12½ feet in diameter.

tion construction is still in its infancy, but it will not be many years before the value of water caused by the great demand for it will lead to the best and most permanent forms of construction.

I wish to thank you, gentlemen, for your very kind attention.

The CHAIRMAN.—Prof. Etcheverry is very willing to answer any questions that may occur to any of the delegates here present.

Mr. CURRIE.—Which is the better in forms 3 inches in diameter, the cement blocks or forms?

A. I would prefer the forms buried in the trench. I will say that I have about 150 lantern slides that will show different systems in use in California, in Colorado and in Nevada.

Mr. ASHCROFT.—In lining a canal passing through some impervious clay has it been found necessary to put in any sub-drainage under the lining?

A. It is recognized that where water is liable to accumulate in the clay, it would be desirable.

Q. Has it come to your special notice where it is a danger to concrete linings?

A. It is very fortunate that where we have to line with concrete the ground drains too well, so the water does not trouble us.

Q. I have found a great objection among the people here against concrete linings; they all believe it is affected by frost.

A. A few years ago I would not have thought much about it but in the east and south it is so, the concrete lining will bear heaving.

Mr. LATIMER.—Are the conditions of North Yakima practically the same as our own?

A. Yes they have had as low as 30 degrees. I believe you people do not get it quite as low as that. Do you?

Q. I would like to ask if you base your estimates of the life of the wooden flume on whether there is a continuous flow of water or whether it is partially filled and partially empty. Would the life of the flume be longer if it was continuously filled?

A. Yes, it would be longer.

Q. In giving the estimates that you did, was it for pipes laid on the face of the earth?

A. I may have been misunderstood. I meant to imply wooden pipes laid under the ground.

Q. What is the difference in cost between laying wood and cement pipe?

A. The cost of laying wood-banded pipe is very small. The cost of laying this small water pipe would perhaps be two cents a foot.

Q. What percentage would the cement pipe cost more than it?

A. The ordinary cement mortar pipe might be laid, perhaps at the outside one-half the cost of the wood pipe.

Q. Have you had any experience with regard to the relative length of life of pipe where used continuously and one in which the water was only turned on during the period of irrigation?

A. The life would be very short where you use it for irrigation. I do not think pipe will last over five or six years and the other pipe will last twenty years or more.

Q. Have you ever seen reinforced concrete work or seen any portion of it?

A. No, reinforced concrete pipe has not been used in this country so much but in Europe it has been put in for thirty years and been perfectly satisfactory.

Mr. BURRELL.—I have just put in 3,000 feet of 6-inch pipe, down some depth, we had some discussion whether it should be put under the ground or on top of the ground. It will be employed part of the year. Will it last better on top of the ground or underneath?

A. It is pretty evenly divided as to whether it will last longer buried or not buried, except if it is under pressure buried, then you can keep the pipe better than if it is above the ground.

Q. My opinion was that it would rot quicker under the ground, and that it would last longer on top.

A. I think it does not have much difference. Alkali will have some effect on wooden pipe.

Q. May I ask Mr. Etcheverry to tell us something about dam construction and I think it will be listened to with interest by the members of the convention.

A. I think I have one or two slides.

Mr. BURRELL.—I would like to have the pleasure of moving a very hearty vote of thanks to Prof. Etcheverry for his very profitable reading and for his coming here and giving us the opportunity of hearing him.

Prof. ETCHEVERRY.—Thank you very much. It has been a great pleasure for me to come and see this country. I was never in the Northwest until three years ago, and during the last three years I have been several times to British Columbia.

Mr. HALL.—I have a telegram from Mr. Grace wishing felicitations and giving his reasons for not being with us. I am going to read it to the members and leave it for them to say whether it is a good and valid reason for him to absent himself from the convention: 'Ten pound boy at home.'

The CHAIRMAN.—Before the motion to adjourn, there is a public lecture by Prof. Etcheverry this evening, illustrated by lantern slides. This has been announced by the press to be a public lecture and we will be very glad to have the public attend. The chairs in the front of the hall will be reserved for the delegates.

Mr. ASHCROFT.—Before the motion to adjourn, I would ask you to request the gentlemen who are to confer with the resolution committee to confer with us directly after the adjournment.

#### **EVENING SESSION.—THURSDAY, AUGUST 4, 1910.**

The first part of the evening session was devoted to an illustrated lecture by Prof. Etcheverry on 'Modern Irrigation Systems and Southern California Irrigation Practice.' This was followed by the consideration of the balance of the report of the resolution committee.

## RESOLUTION No. 8.

*Moved by V. D. Currie, Seconded by A. E. Ashcroft.*

‘Whereas many cases have arisen in British Columbia and many more may occur in the future in which an exchange of the rights to water would not only be on the lines of economical management but add very largely to the areas that might be irrigated;

‘Therefore be it resolved that the attention of the British Columbia government be directed to this matter with a view of having amendments made to the Water Act to enable such exchange of rights to water and additions to the irrigable area to be given effect to.

Mr. CURRIE.—This resolution has reference to exchange of water. In a case where you owned land on a creek and a man held a prior record below you, on a river with a fall below you, you could by putting a dam in that river and filling it at the time you wanted the water, turn the water from that river into the creek and take the amount that you agreed upon, it is real exchange of water. There are many cases of exchange of water, and there are cases on the American side where two or three persons exchange from one river to another and it is a very valuable thing to have laws to allow a person to do that. I know a case where an exchange of water in a stream could be used to advantage; where a man with a subsequent right in the stream by going to the expense of grading that stream could prevent a considerable waste of water and I think it extremely important that the government be asked to place some law, some provision, on the statute books covering that point of the irrigation system.

There is another thing: We have our main rivers running through the larger valleys like the Thompson, and immense flats around that river are irrigable by streams coming in from the higher levels and by water that comes down through streams passing through the valley lands, that will irrigate the land alongside the river; and it seems to me that if there is an exchange made, the people living upon them, even though they had subsequent records, could, by putting in pumping plants, deliver water to the prior record-holder, and save it running off the higher level, and this resolution is aimed to induce the government to pass some legislation along that line.

Mr. ASHCROFT.—I second the motion. I will not take up the time of the convention by making any lengthy remarks upon it. The only thing about it that I wish to say is that any alteration made in the Act granting any exchange will have to be made by the consent of both the owners of land at the time the exchange was made. I think that something of this nature is required as irrigation difficulties must arise more and more and water can be used to great advantage in different places.

Mr. PEARCE.—I rise to ask a question. I have not got a copy of the Water Act, but if it has a provision that most acts have, I think that will probably be provided for in that clause that is generally inserted in all acts giving the lieutenant-governor power to provide for anything that is not provided for.

The CHAIRMAN.—I think not. I might say for the information of the members of the convention present, that the exchange system of Colorado was brought to my notice and I made inquiries about it, and about how it worked. Apparently it was

a necessity there and apparently that arid land could not be irrigated without it. In drafting the Act I went into it with Mr. Charles Wilson. He had no knowledge of it but I explained to him as far as I knew myself and we deemed it better not to deal with it at the inception of the Act. It was entirely new to this province and we decided to leave it out and let the new Water Act get in force and let it work out and the legislature could see how to provide for it then, and they would be better able to legislate for it then than we were at that time. It is in my opinion a very good thing in certain parts of the country, and it is a very good thing to draw the attention of the government to it and have them take it into consideration.

Resolution carried.

#### RESOLUTIONS 2 & 9.

The CHAIRMAN.—The resolution committee after conferring with the movers of the original Nos. 2 and 9 have amalgamated them into one resolution. I would ask the secretary to read it.

‘Whereas certain existing conditions of ownership and control of irrigating systems in British Columbia are far from satisfactory in some portions of the country, resulting frequently in waste of water and inadequate distribution.

‘And whereas certain districts have not the necessary capital to install irrigation systems, thus leaving large areas of good land useless because of insufficient water supply.

‘Be it resolved by this convention that the government of British Columbia be asked to take steps towards insuring the better conservation and control of the sources of supply in those districts in which governmental action would clearly make for a fuller supply of water and its more equitable distribution.

‘And further, that the government be asked to assist, by guaranteeing the bonds of municipalities or companies, those districts where otherwise large tracts of land must remain unproductive for lack of adequate irrigation systems.’

The CHAIRMAN.—You have heard the resolution. We have had a good deal of discussion this afternoon on the first part of it, which was then resolution No. 2. No. 9, which was not before the convention this afternoon, is now amalgamated with the other part of the resolution and I think it only fair that the mover of No. 9, if he wishes, should have the opportunity to speak.

Mr. HAWKS (mover of the original No. 9).—I would like to bring before this convention two concrete examples of what I have in mind. We will say there are ten ranch owners, having each of them perhaps forty acres of land. The stream flows at high water in sufficient quantity to insure them ample irrigation. The possibility of conserving this water in a lake would depend on united action by all these ranchers, but if they do not get together and store this water, they will not store a sufficient amount for the soil. If, however, they know the government will assist them materially in the underwriting of their bonds, and will guarantee the interest thereon, this ownership system will almost surely go ahead. These men will all have ample water for their lands, and what is now practically a dry community will then be served with water, to the great benefit of the community.

Take another case: we will say there are ten millionaires considering the damming of lakes to develop power thereby, and to establish a water irrigation system pumping plant on, say, our Thompson river. Our lands that are now practically valueless will be turned into ranches, raising fruit of the finest quality. It would be hard work to interest capital to the extent of perhaps \$5,000,000 to carry that through, but if those capitalists know that bonds would be underwritten or the interest thereon guaranteed by the government in the same manner that the government stands back of bonds of railway companies it would bring capitalists to start such a system and turn our 20,000 or 30,000 acres of practically worthless land into a wonderfully valuable section of the country.

I take it that this plan is not exactly a governmental affair to carry forward from start to finish. It is more in the line of private enterprise but it is hard to interest capital to go into the matter to such a large extent unless with some government assurance. I think if the conditions were shown to the government in proper form they would not hesitate to endorse such a proposition in that manner. These lands will rise in value from almost nothing now to \$250 an acre. The government will receive greater returns from the taxable value of such lands and the community will benefit as the company directly interested progresses.

Resolution carried.

The CHAIRMAN.—This will complete the resolutions except that a resolution might be adopted asking the Dominion government, to kindly print the report of this meeting as they have done in previous conventions but I understand there is a letter from the Minister of the Interior that they will be willing to print our report.

Mr. HALL.—I would like to move a vote of thanks to the Minister of the Interior for this courtesy.

The CHAIRMAN.—Yes I was going to suggest that; before we adjourn, we ought to move a vote of thanks.

Mr. HALL.—We have here a letter from Mr. R. H. Campbell, Superintendent of the Forestry Branch, at Ottawa, who has been prevented from attending this meeting although he has been present at our other meetings. He has written a letter which is covered by Mr. White's paper but I think it is only right that the motion should be made that the letter be printed in the report of the proceedings.

Mr. PEARCE.—I move that Mr. Campbell's letter form part of the printed report of the proceedings of this convention.

Mr. BURRELL.—I have pleasure in seconding that motion.

Carried.

DEPARTMENT OF THE INTERIOR,

FORESTRY BRANCH, OTTAWA, July 29, 1910.

C. E. LAWRENCE, Esq.,

Assistant Secretary,

Western Canada Irrigation Association.

Kamloops, B.C.

DEAR SIR,—I beg to acknowledge the receipt of your letter of the 21st instant, and I appreciate very deeply the importance of the question which you raise in regard

to forest fires, and which you think should be considered by the convention. There is no doubt, whatever, that the question of the prevention of forest fires is one of the most important for our whole country, and especially for the irrigation districts. The matter is an exceedingly difficult one to deal with, and it has been taken up earnestly by both the Dominion and provincial governments. The enactment by the provincial government at the session of 1909, that no fires for the clearing of land should be set out between the 1st May and the 1st October without a permit from a fire warden, has helped the situation considerably as this provision of the Act has been well administered by the provincial authorities.

The sources of danger of fire are several and they vary as to which is the most prominent cause in different districts.

The railways, either directly or through the traffic which they bring along their lines, are responsible for the setting of a good many fires. To prevent this a closer system of inspection of the equipment of the locomotives is necessary. The Railway Commission have regulations which should be fairly effective, but they have only three or four inspectors for the whole western country and I think that an arrangement should be made with the Railway Commission so that at least the chief fire rangers should have the authority, as agents of the commission, to inspect locomotives at any time. But even with the locomotives properly equipped, and using proper fuel, there is still a danger of sparks being thrown of sufficient size to start a fire if they fall in a favourable spot, and even if the fullest equipment is provided for, it will be necessary to go further and have the provision of the Railway Act, which provides that the right-of-way shall be kept free of inflammable material, thoroughly enforced. I took this matter up with the Canadian Pacific Railway Company in regard to their right-of-way through the railway belt in the province of British Columbia and they are having their right-of-way thoroughly cleared up by contract. Considerable work to this end has already been done and is being pushed ahead rapidly.

Even if the right-of-way is cleared up, however, there are places where there is considerable dead and down timber just outside of the right-of-way, and sparks may, with a strong wind, carry beyond the right-of-way at times. In order to make matters safe, such debris should be cleared away and an arrangement should be made to get this territory cleared up. Where the lumber companies are responsible for leaving such slashings in their operations, they should take the responsibility of having the clearing done. One of the reasons why there is such immunity from forest fires along the railways in Europe is that the right-of-way is kept cleared and that there is a thoroughly cleared path outside of the right-of-way continuously wherever the land is forested. Of course, in addition the forests themselves are kept clear of dead material in a way that cannot be done in Canada, as yet.

A great many fires are caused by prospectors, travellers and freighters. These are, possibly, sometimes set deliberately but are generally due to carelessness. Camp fires are left unextinguished or matches are thrown down carelessly by men who are smoking. The only way to meet this difficulty is to have a sufficient staff of fire rangers to patrol the country and to warn all such people and watch them sufficiently closely to make sure that the responsibility for any fires which may occur can be placed on the right shoulders and the offenders brought to account.



Fires also occur through settlers using fire for the clearing of their lands. This is one of the most serious difficulties and the provision in the British Columbia Fire Act, to which I have referred, where enforced, seems to be the best remedy, unless the use of fire for clearing land in the summer season is absolutely prohibited.

However, the most important point of policy in regard to the whole question, as it presents itself to my mind, is to decide that the forest is to be a permanent feature of our civilization, and then deliberately set apart a certain tract, generally unsuitable for agriculture, which will be kept permanently in forest, and in regard to which a clear and well recognized policy can be carried out. If a forest tract is made a permanent reserve it can be looked after very much better than it can otherwise. Permanent rangers can be appointed; they can keep track of persons going and coming through the forest; they can see that all these people are warned, and can locate the causes of fire much better in cases where they occur and, further, such improvements as making roads and fire lanes, clearing away of dead material where it is in dangerous situations, and the plowing of fire guards and other works of a precautionary nature, can be carried out where the investment is a permanent one and where the expenditure would, consequently, be justified.

I regret that none of the officers who are directly connected with the forestry division of our work will likely be present at the convention, but the members of the staff who will represent the department can speak in regard to the matter, although they are more directly connected with the irrigation division. I regret very much that it is impossible for me to attend the convention, personally, as I have always enjoyed very much the meetings of the convention, and have a very kind recollection of the hospitality which has characterized them.

Yours very truly,

(Signed) R. H. CAMPBELL,

*Superintendent.*

Mr. ASHCROFT.—I have much pleasure in moving a vote of thanks to the department at Ottawa for the kind offer to print the report of the proceedings.

Mr. CARRUTHERS.—I am very glad to second the motion.

Carried.

Mr. ASHCROFT.—While on the subject of printing I think it might be advisable to move that all those papers that have been prepared for this convention and which have not been read, owing to lack of time, be handed in to the secretary and printed as part of the proceedings of the convention.

Mr. BILLINGHURST.—I second that motion.

Carried.

Mr. PALMER.—I believe there are a number of the delegates proposing to go west to-morrow night. I think it a good plan if arrangements could be made for an extra car going west. I would like to know how many are going.

Mr. HALL.—We shall endeavour to arrange to have extra accommodation going east and also going west.

Mr. PALMER.—I move that we adjourn until to-morrow morning.

Mr. SPIERS.—I second that motion.

Carried.

#### MORNING SESSION.—FRIDAY, AUGUST 5, 1910.

The local committee of the Western Canada Irrigation Association took the members of the convention for a boat trip up the Thompson river to Fruitlands where lunch was served.

#### AFTERNOON SESSION.—FRIDAY, AUGUST 5, 1910.

The CHAIRMAN.—I think we had better take up the last item on the programme first and having got that out of the way we will see how much time we still have.

#### ELECTION OF OFFICERS.

Mr. BURRELL.—You are asking for nominations are you?

The CHAIRMAN.—Yes. The first officer should be the hon. president. Last year Hon. James Dunsmuir was appointed. I think that we had better leave that until the place of meeting is fixed.

Mr. BURRELL.—I have very much pleasure, Mr. Chairman and gentlemen, in nominating for the office of president of the Association, a gentleman who has long been identified with practical irrigation work in western Canada, whose services have been of immense value and who has long been a very energetic, active, and sympathetic worker in regard to the Association. I nominate Mr. William Pearce of Calgary.

Mr. JAMIESON.—I have much pleasure in seconding the nomination of Mr. Pearce for president of the Association for the ensuing year.

Mr. PALMER.—I move that the nomination is closed.

Mr. DAWSON.—I second the motion.

Carried.

Mr. Pearce was unanimously elected.

Mr. PEARCE.—Mr. Chairman and gentlemen: I wish to say that I appreciate the honour very much which has been conferred upon me in making me president and I hope I will come up to your expectations. I can only say that I will try to do my best.

The CHAIRMAN.—Now we have two vice-presidents, a first and second.

Mr. PALMER.—I move that Mr. Fulton be elected for first vice-president. I think the members of the Association will agree that no one in British Columbia can represent the interests of those who are concerned with irrigation better than Mr. Fulton.

Mr. HALL.—I have very much pleasure in seconding that motion. I had the honour last year of nominating Mr. Fulton as president and it has been a source of great pleasure to me to have had him to work with during the past year.

Mr. BURRELL.—May I have the pleasure of asking for an expression of opinion. All those in favour.

Carried unanimously.

The CHAIRMAN.—I beg to thank you for electing me to this office. I have been connected with the Association since its incorporation. I have taken a great interest in it and I am glad to see the interest taken in this convention. I believe we have 142 delegates this year and I hope that interest can be kept up, and I assure you I shall do my best for the interests of the Association.

Mr. HALL.—I place before the convention the name of a gentleman who has always taken a great interest in the work of the Western Canada Irrigation Association. I have great pleasure in naming Mayor Jamieson, of Calgary, as second vice-president.

Mr. ROBINSON.—I second the motion.

Carried unanimously.

Mr. PEARCE.—If it is in order, Mr. Chairman, would it not be advisable that we should decide where the next place of meeting is to be, before we go on with the election of officers.

The CHAIRMAN.—I think it is quite in order, if it is the feeling of the convention that the selection of the place of next meeting be decided.

Mr. LAWRENCE.—I have received a letter from the city council of Calgary inviting the Association to hold its convention next year at Calgary.

Mr. JAMIESON.—I extend a very cordial invitation on behalf of the city of Calgary to this Association to hold its next convention in our city. As you know, Mr. Chairman, and most of the gentlemen know, Calgary is the city in which the Association was formed in 1907. We are deeply interested in questions of irrigation in and around Calgary. We have very large irrigation works going on throughout that district and we believe that we are fairly centrally situated for the convenience of the members attending the convention in that city and we should be very pleased indeed if this convention can consider our request that the convention be held in Calgary next year. We shall be very glad to have all those interested in irrigation matters with us and give us help with respect to our problems in this very important work in that part of the country and I have very much pleasure in extending a very cordial invitation to this convention to hold their meeting of 1911 in that city.

The CHAIRMAN.—I think that is a motion that we have the convention in Calgary in 1911.

Mr. JAMIESON.—Yes.

Mr. TREGILLIS.—I second the motion.

Carried.

The CHAIRMAN.—The place of meeting having been fixed we can proceed with nominations for the executive committee. The secretary calls my attention to the fact that we should have appointed a treasurer.

Mr. WEBSTER.—In connection with the office of treasurer I beg to submit the name of a man who has taken a great interest in the work of this Association since its inception, Mr. C. W. Rowley, manager of the Canadian Bank of Commerce.

Mr. LAWRENCE.—I would ask to be allowed to second that motion.

Carried.

The CHAIRMAN.—We will now proceed to elect the executive committee.

Mr. ROBINSON.—I nominate Mr. Peterson, of Calgary.

Mr. PEARCE.—Can I nominate two at once, if so, I will name Mr. W. H. Fairfield, of Lethbridge, and Mr. C. A. McGrath, M.P., Lethbridge.

Mr. SAUDER.—I will nominate Horace Greeley, of Maple Creek.

Mr. ROBINSON.—I nominate Mr. Martin Burrell.

Mr. BURRELL.—I would ask that, with the mover's permission, I be allowed to withdraw as it is impossible that I should take an active part.

Mr. BAKER, of Kelowna.—I name Dr. Dickson, of Kelowna.

Mr. HALL.—I name A. M. Grace, of Medicine Hat.

Mr. CURRIE.—I nominate Mayor Robinson of Kamloops.

Mr. ROBINSON.—I ask to have that withdrawn.

Mr. BURRELL.—I nominate Mr. R. H. Agur, of Summerland.

Mr. R. M. BROWN.—I nominate Mr. R. M. Palmer.

Mr. PALMER.—I would like to withdraw, as there is one too many.

Mr. HALL.—I will withdraw the name of Mr. Grace.

Mr. PALMER.—As the meeting is to be held in Alberta, I think the name of Mr. Grace should stand.

The CHAIRMAN.—If the name of Mr. Grace is allowed to remain, as the matter stands now, there are four from Saskatchewan and Alberta and three from British Columbia.

Mr. PEARCE.—I move that the nomination is closed.

Mr. JAMIESON.—I second the motion.

Carried.

The CHAIRMAN.—We have a permanent secretary so there is no need to elect him.

Mr. JAMIESON.—The hon. president is now in order I suppose. Since it has been decided for Alberta I have much pleasure in moving that Hon. Lieutenant-Governor Bulyea be made honorary president of this Association for the ensuing year. I might add, Mr. Chairman, that Mr. Bulyea has been interested in irrigation projects for a considerable length of time, particularly in the Okanagan valley. He is a man largely interested in irrigation and will no doubt take a live interest in the work of this Association. For those reasons I would place his name before the convention.

Mr. PEARCE.—I second the motion.

Unanimously elected.

The CHAIRMAN.—We have considerable time left before there is any necessity for adjourning. I might add that I have been asked to announce for the benefit of such delegates as are not leaving before the 7.25 train, that there is a garden party being given by the ladies connected with the library, and they intend to dispense ice cream for the benefit of the library funds.

I think that Mr. Thrupp has a motion he wishes to put.

#### RESOLUTION No. 10.

*Moved by Mr. E. C. Thrupp, Seconded by Mr. J. M. Harpur.*

Mr. THRUPP.—Mr. Chairman, ladies and gentlemen: I wish to move 'That the executive be requested to consider a modification of the constitution of this Association by admitting any persons who may be interested in irrigation.' I think there is somewhat of a feeling that the Association as it is incorporated does not afford the people who are really interested in irrigation a say in the proceedings of the meetings and I beg to move the above resolution.

Mr. J. M. HARPUR.—I beg to second that resolution simply to bring up discussion.

Mr. HARVEY.—I think it a great mistake. The constitution is very wide, and gives us very wide liberties indeed and I would be very sorry indeed to see any such motion as that passed.

Mr. LAWRENCE.—I would like to say I think a very wise motion would be to admit the general public to these meetings and many a man might get a great deal of information in consequence.

Mr. BARNES.—I would like to support it on these grounds: I find there are numbers of farmers who have no right to come to the convention, and cannot come without getting credentials, who would like to come. How is the farmer to hear what is going on unless he can have the opportunity of being present? As the matter now stands the farmer has no right to come unless he belongs to a company or a board of trade or a farmer's institute, and if he had no farmer's institute in the neighbourhood and no board of trade, there is no representative to come from that part of the country. I would therefore like to support the motion.

Mr. A. E. HOWSE.—I am very heartily in sympathy with this motion. In Nicola, the board of trade proceeded to elect me to attend this convention. We made strong

efforts to get a farmer but unfortunately the convention was held at an inconvenient time and as a consequence I am here, a business man, representing the farmers of Nicola. Different farmers in that section of the country would have liked to come, and they said to me that if they thought they would be admitted, they would have been glad to come. I think if you change this resolution by inserting the words 'practical farmer' you would meet with that widespread interest among the farmers which is so much desired by this Association. I do sincerely hope that you may find it possible to have the meetings held at a later or an earlier time, probably a short time before the House meets, and especially when you expect to bring down legislation, and it will then all be very fresh in our minds. You could probably get a strong committee to go and place the resolutions before the government, and I would suggest further that the time of the meeting be changed to an earlier or later date.

Mr. RICARDO.—I think we ought to have that part of the constitution read.

Mr. HALL.—I will give you a list of those competent to be appointed as delegates:

The Governor General of Canada, members of the Dominion cabinet, the Senate and the House of Commons, the Dominion Commissioner of Irrigation, Superintendent of Forestry, the Director and Superintendents of Dominion Experimental Farms, five representatives of the Canadian Society of Engineers, two representatives from each Canadian railway and one from each agricultural paper in Canada.

From the provinces of Manitoba, Saskatchewan, Alberta and British Columbia:

The lieutenant-governors, the members of the legislatures, the deputy ministers of Provincial departments, provincial irrigation commissioners, three each for all irrigation and irrigation colonization companies, two each for all agricultural, forestry and live stock associations, five each for all cities, appointed by the mayor, two each for boards of trade or similar organizations, two each for all town, village or rural municipalities, to be appointed by the mayor, reeve or overseer, two each for all Canadian Clubs, to be appointed by the president, the superintendent or representative appointed by him, for each experimental or demonstration farm, three representatives from other irrigation associations, to be appointed by their presidents.

Mr. RICARDO.—I think the motion is too open, because I know that we had no difficulty. We could have sent half a dozen delegates and given them credentials from our part of the country. If we pass this resolution it will put the power of the convention in the hands of the people of the town in which the convention is held. There is no doubt that in this town if that had been known you could have gathered up one hundred farmers easily, and I suppose in Calgary you could pick up five hundred easily, and it would leave the convention absolutely in the power of the town in which it is held. As it is now there is not any place that could not send from half a dozen to ten and give them the necessary qualification.

Mr. BURRELL.—Will you kindly read the resolution again?

Mr. THRUPP.—That the executive be requested to consider a modification of the constitution of this Association, by admitting any persons who may be interested in irrigation.

Mr. PALMER.—Is it intended that all persons can come to the convention not as delegates, but simply to be admitted to the convention.

Mr. HALL.—I presume that the intention is that they should have voting power.

Mr. PALMER.—In that case it would not be wise. Local questions could be introduced in a meeting of this kind, and it would be unwise that local questions should swamp a meeting held for the benefit and in the interest of the country.

Mr. ROBINSON.—Is it a motion to amend the constitution?

The CHAIRMAN.—I do not think it goes as far as that. It simply suggests to the executive who can advise the amendment of the constitution.

Mr. ROBINSON.—The executive has no power.

The CHAIRMAN.—It is simply a motion to the executive to consider it.

Mr. GEORGE.—I wish to say something about the matter. If the ranchers are not allowed to come here and speak just because they are not learned enough, how can they ever hope to get on?

Mr. PALMER.—They can speak through representatives.

The CHAIRMAN.—Are you ready for the question? We will take a standing vote. I declare the motion lost.

Mr. George expressed a wish to me yesterday that he be allowed to make an explanation of something he said the first day.

Mr. GEORGE.—I am not a very good speaker and it appears from what I can gather that I said something about shotguns and people shooting for protection of water rights. I did not mean that really. When I spoke about shotguns all I meant was to show you the seriousness of this question to this country. We came here five years ago and have ever since then been trying to get our rights. We have approached Mr. Fulton and other gentlemen and nobody has any authority. I want to find out who has the authority. Here we have water records away back in the seventies. We have put our land under irrigation, and have one hundred acres of land, and we cannot get enough to grow pasture. What I want to know is if the government gets control of this water, and if they appoint commissioners, suppose it takes five or six years before they look into our case what are we going to do? Take our case to court or let these men steal our water, for five years? I want to say we have been here for ten years and have a fine ranch, and have everything that we want, but we have not got the water and cannot live without the water. We pay for the water and have a right to it, and the government officers sit pat and smile. I beg to apologize for speaking as I have straight from the shoulder, and if people do not like it I am very sorry. I am here to make it plain and I want everybody to know the state of affairs. The government must get to work and look after the water rights. They have to do something now, and not six years from now. We cannot sit here and see our places burnt up while we pass resolutions and do this and the other thing. We want the government to do it now and the people appoint the government to do it and why should they not do it. I beg to apologize if I say anything that is not right, and I thank you all for allowing me to speak, and I thank you, Mr. Chairman.

The CHAIRMAN.—We still have some time at our disposal. There are still four papers, two from yesterday's session and two for the afternoon. I would ask if Mr. Drake and Mr. Sauder wish to read their papers now?

Mr. DRAKE.—I would be glad to follow the suggestion of the secretary and prepare a paper to be printed with the report of the proceedings. It was a surprise to find my name on the programme for a paper, and I hurriedly took a few notes but I am very glad indeed that there has been so much important discussion that there has been no time to call upon me. Mr. Hall has suggested that he would like to have a paper on the irrigation development of Saskatchewan and Alberta that could be printed as part of the proceedings of the convention, and if that meets with the approval of the convention, I would be glad to prepare such a paper.

Mr. SAUDER.—Like, Mr. Drake it took me by surprise to see my name on the programme, and as Mr. Hall has suggested that he would like to have a paper prepared to be printed as part of the report of the convention I shall be very glad to prepare the paper.

The CHAIRMAN.—The next is the paper by Mr. E. C. Thrupp.

Mr. THRUPP.—I have given the paper to the reporter but if it meets the wishes of the convention I shall be pleased to read it.

The CHAIRMAN.—I am sorry the attendance is so small at present.

Mr. THRUPP.—I do not mind that, it was a question of time.

Mr. CURRIE.—I feel that the people are rather tired and I would like to withdraw my address. I have no paper to read, and I have much pleasure in withdrawing my address and will have great pleasure in listening to Mr. Thrupp.

The CHAIRMAN.—Then Mr. Thrupp's paper will be the last thing on the programme.

MR. E. C. THRUPP, A. M. INST., C. E.

The Chairman then introduced Mr. Thrupp who read the following paper:—

NOTES ON THE HYDROLOGY OF THE KAMLOOPS DISTRICT AND OTHER POINTS RELATING  
TO IRRIGATION.

Official records of rainfall at Kamloops show an average annual precipitation of about  $8\frac{1}{2}$  inches and snow about 37 inches. Ten inches of snow are reckoned equal to 1 inch of rain so the total precipitation averages about 12 inches.

The total accumulated depth of snow left on the ground at the end of winter has been known to reach 12 or 14 inches but that is extremely rare.

As a rule the snow evaporates rapidly, while the ground is still frozen and rarely lies more than 3 inches deep. The ranchers who have storage records on lakes or reservoirs put their hopes upon the snow being melted by a 'chinook' before the ground is thawed, so that the water may run off rapidly into the reservoirs. If the melting is slow the water soaks into the ground on the hills and is mostly lost by evaporation afterwards. The chinook, although reported to be a westerly wind, generally arrives at Kamloops from the southeast.

There are no available records of rainfall in the upland areas, but it is well known that above the 3,000-foot contour, the rainfall is considerably greater than at Kamloops although it comes chiefly in light showers. In Dr. Dawson's report on the



geology of Kamloops there is an appendix giving numerous temperature observations at these higher levels compared with those at Kamloops, from which it appears that the daily minimum temperatures decrease by about  $4\frac{1}{2}$  degrees for each 1,000-foot rise. This figure closely corresponds to the natural variation of temperature by the com-



Measuring box and concrete distributing flume for furrow irrigation, Riverside, California.

pression or expansion of air passing from one elevation to another. The prevalence of strong winds which penetrate all parts of the valley accounts for the agreement of the figures, and as the same variation of temperature and pressure has the effect of changing the moisture-bearing capacity of the air by about 20 per cent for each 1,000

feet difference in elevation, it will be seen that the air dipping into the valley is automatically dried. If our winds were so gentle that they would pass overhead leaving the valley air practically undisturbed we should get more rain generally, and in fact the heaviest rainfalls occur on days when the atmosphere is calm, according to the meteorological notes.

Mists in the bottom of the valley are very rare. In calm weather there are sometimes mists with fine rain or snow above the 2,000-foot level, and clouds sometimes settle to a little below that level and disperse in the mornings.

High winds induce high rates of evaporation and when they are deprived of most of their moisture in coming over ranges of forest-clad mountains reaching to 6,000 feet or more above sea level, and then further dried on dipping into the valley, it is not to be wondered that Kamloops is a dry place. Thunderstorms on the surrounding mountains are sometimes accompanied by dust storms in the valley and very few drops of rain.

Above the 3,000-foot level crops of oats are raised with moderate success without irrigation but from that level downwards irrigation becomes more and more necessary. These remarks apply to the district within thirty miles east and north and for greater distances west and south. Beyond that zone to the east and north the conditions change rather rapidly and round the fringe of this dry belt the settlers boast of being able to do without irrigation, but there are times when they would be glad to get some, and applications for records are being filed by residents in the doubtful zone in increasing numbers.

The yield of the streams within the dry belt is a matter requiring far more attention than it has yet received. In humid countries in the temperate zone it is well known that where the rainfall amounts to 25 to 40 inches the loss by evaporation and absorption by vegetation is about 16 to 20 inches and this loss is much more constant than the rainfall, and in the case of such rivers as the Thames and the Seine the flow off the ground only amounts to 7 or 8 inches. What can be expected then in countries like this with only about 12 inches of rain and snow combined? From the author's gaugings and observations and information collected during the last eighteen months, it is quite clear that many of the gathering grounds in this district cannot be relied upon to yield even 2 inches.

The total annual rainfall is not a safe guide as to the possibility of dry farming in any district. On a wide plain a rainfall of 12 inches might be enough for the biennial system of cropping, but the same total rainfall in a narrow valley where all the air comes 2,000 feet down from the mountain the showers are more likely to be very light and less useful.

By the courtesy of Mr. Palmer, the meteorologist at Kamloops, the following data have been obtained from the daily record books. Taking two years at random (1907 and 1908) it appears that the heaviest rainfalls on one day were:—

Inches.	
1.17 . . . . .	September 17, 1907
0.635 . . . . .	August 25, 1906
0.470 . . . . .	June 19, 1908
0.430 . . . . .	August 29, 1908
0.340 . . . . .	" 17, 1907

Inches.	
0.31 . . . . .	..September 16, 1907
0.31 . . . . .	..June 29, 1907
0.295 . . . . .	..August 5, 1907
0.26 . . . . .	..October 1, 1908
0.255 . . . . .	..June 27, 1908
0.25 . . . . .	..October 19, 1908

This shows only eleven occasions in two years when the rainfall reached  $\frac{1}{4}$  inch in one day.

It has been shown by Prof. King that the rate of evaporation from wet soil in hot weather is about 0.40 of an inch per day. As there were only four occasions when the rainfall exceeded this quantity it will be seen that the rainfall here is not such as to make much impression on the soil. The best authorities upon dry farming agree in advising cultivation with a dry soil mulch  $2\frac{1}{2}$  inches deep. To succeed without irrigation it is essential that there should be enough heavy falls of rain to moisten the soil to greater depths than  $2\frac{1}{2}$  inches either in a single day or on several successive days.

In the two years referred to there was only one single day that event would have occurred. Taking four successive days it would require an aggregate of  $1\frac{1}{4}$  to  $1\frac{1}{2}$  inches to begin to make an impression below the mulch and the records show only one such occasion in the two years, namely September 14 to 17, 1907 (1.675 inches). The next best aggregate was 1.285 in six days, August 24 to 29, 1908.

Compare these conditions with those of the United States districts where 'dry farming' is successful.

F. L. Briggs and F. B. Balz, of the United States Department of Agriculture, state that no part of the dry farming section of the United States is free from torrential rains, although they are more frequent in the south. Regions in which the rain fall is largely in the form of little showers from  $\frac{1}{10}$  to  $\frac{1}{2}$  inch are not well adapted to summer fallowing. The amount of water which falls in a small rain penetrates the soil only a few inches and is practically all lost through evaporation when the surface soil is cultivated after rain.

A. E. Chamberlain of South Dakota stated at the Dry Farming Congress that 1 inch of rain in one hour was not an unusual phenomon in any of those western states. In his district in the driest year the total rainfall was  $10\frac{1}{2}$  inches, of which 8.55 fell in the five growing months.

In the face of these facts it would require a most enthusiastic dry farmer to attempt business without irrigation in the dry belt section of the Thompson valley, although in the bottom lands with subsoils saturated at the river level, deep rooted crops and trees may require very little irrigation when they are thoroughly established.

The precarious nature of irrigation water supplies drawn by gravitation from gathering grounds situated in the dry belt is being more and more felt every year and it is very desirable that the risk should be more thoroughly understood to avoid serious losses and disappointments. In some cases it will require one square mile of gathering ground to yield enough water to irrigate twenty to thirty acres, and the supply may not be available until May and will sometimes dry up in July. If there is storage the supply may be prolonged later in the season at the expense of consider-

able loss by evaporation from the surface of the reservoir. A loss of  $\frac{1}{4}$ -inch per day is quite common, and the total annual evaporation in the driest and hottest years may reach 60 inches, so if the yield of the gathering ground is only 2 inches it requires 30 inches of the area of the reservoir, to supply the water that is evaporated. There are numerous high level lakes in this district which would be more satisfactory as reservoirs if they were much smaller in area, and there are many amateur efforts at construction of dams which have been carried out upon futile hopes of great water supplies. The future of irrigation in the dry belt lies not so much in storage as in pumping, mostly but not entirely by electricity. The Thompson rivers have a gathering ground of over 14,000 square miles and discharge enough water to irrigate several million acres. It is an unfailing supply drawn chiefly from the melting snows and heavier rains outside the dry belt zone. The average man will say that the cost of pumping is far too great except on the lowest land, but let the point be considered and see how far the agriculturist can meet the engineer and work out the most economical system.

Firstly as to the quantity of water required. Let every one study the question of economy of water and the best methods of soil culture. Dry farmers can teach irrigationists a lot on this question, and irrigationists can learn how and when to apply water to get the best results, and it must be left to the farmer to decide precisely how he will deal with his crops, but the first suggestion from the engineering side is—extend your irrigation season.

The gravitation supply generally hampers the farmer by limiting the season. With a pumping supply the water will be available for nine months in the year and can be applied to the land before ploughing either in the fall or the early spring. In this district the difficulty has been to get the land into a nice moist condition before seeding in the spring.

At Reno experiments were made with one application of water before ploughing in the fall and the crops obtained the following season (1907) were very satisfactory, the winter wheat running from 26.8 to 36.6 bushels to the acre.

At the British Association meeting at Winnipeg in 1909 an experiment by Prof. Alway was mentioned, in which some Red Fife was grown to maturity in 143 days under a glass case in which 6 feet of soil were placed and saturated at the start, but no other water added during the period of growth.

Prof. Campbell tells us to plough in the fall if the ground is moist, and adds that the condition of the ground when ploughing cuts more figure than the time of year. With this authoritative advice, surely the farmer may decide for himself when he will put his ground into the necessary moist condition by irrigating out of the growing season.

The next suggestion is—adopt mixed farming and arrange cropping so as to utilize the water as continuously as possible.

Farmers would do well to arrange to work in pairs or groups supplied from one source and taking the water (or most of it) in alternate weeks or such other periods as they may prefer.

The reason for these suggestions from the engineering side is that it is far cheaper to pump water continuously for five or eight months than to merely irrigate in the middle of the growing season, and the cost to the farmer will be much less per acre—

foot if he spreads out his operations over the longer period. If farmers will seriously study this matter from the agricultural side there is every prospect of successful and remunerative irrigation on lands situated high above the river level at charges quite within reason, and even if some of the charges come to more than has been usual hitherto, there will be the satisfaction that the supply is certain, and results can be relied upon, and farming operations spread out to suit the man who has a difficulty in getting help in the usual busy seasons.

The nature of irrigation contracts is a matter of vital importance to the farmer who puts all his capital into his business upon the strength of the contract for the supply of water.

Irrigation contracts should be for definite periods of say five to ten years, renewable by the customer for successive periods of five years.

That would enable the user to obtain a practically permanent right without committing him to a permanent obligation, and it would be sufficient for the purposes of a company irrigating by pumping.

The terms of the original contract should not be varied by any intervention of the government, but it would be open to users to terminate at any of the specified dates and bargain for better terms or get his power from another source, and he should be entitled to demand terms equal to those being offered to new customers in his neighbourhood during the preceding twelve months. In that way he would get the benefit of reductions in price granted by the company to increase their business in his district.

No company should be allowed to raise the price charged without becoming subject to independent control, but they should be free to charge new customers a higher price if their existing contracts are not found to be remunerative, and in that event the older customers would naturally renew their contracts on the old terms.

The principle of freedom of contract and absolute respect for existing contracts is essential to keep the whole business up to the traditional standard of British fair play, and to secure the confidence of capitalists on the one side and of settlers on the other.

Under the Dominion regulations for the prairie provinces and in the British Columbia Water Act power to vary contracts is reserved to the governments. With all due respect to both governments the author submits that these laws are liable to create a lack of confidence on both sides and check the settlement of the lands requiring irrigation. The intention is no doubt sound in the interests of the public to prevent settlers being held up by companies which may get their customers in a corner. To meet such a contingency it could be enacted that when any company finds it necessary to ask for increased payment from existing customers it should be treated as a bankrupt concern and put under the control of a receiver acting in conjunction with a committee elected by its customers.

Under such a regulation companies would be careful in fixing the terms of their original contracts, and as in all business operations the growth of production tends to reduce the cost of the article produced there should be no difficulty in sound concerns keeping solvent.

No excuse for bad management or bad engineering should be tolerated or regarded as a justification for upsetting contracts and compelling the customers to pay more to

provide dividends for the offending company. If the circumstances are so bad that some drastic action seems necessary, a public inquiry should be held in the district and the whole matter investigated and treated as is usual with bankrupt companies.

It is not at all necessary that irrigation companies should originally own the whole of the land they intend to irrigate, although it is desirable that they should own some land, so as to be free from trouble by combinations of landowners seeking to prevent the company from starting business except at rates so low as to preclude the possibility of dividends being earned. Experiences of power companies in other parts have been so unhappy owing to expected customers holding aloof after the works have been constructed that it would be idle to expect capital to be invested here without sufficient security in preliminary contracts or possession of land to avoid trouble at the outset.

One desirable aid to success is the existence of customers sufficiently near together to provide the minimum business needed and it is therefore desirable to do business with every one along the line of mains, although it is not so essential as in the case of gravitation canals.

To reach the homesteader or pre-empter is also important in order to assist in the general settlement of the country. Some people favour the idea of the government undertaking to carry out works for this reason or to guarantee the interest on the capital of companies doing the work. Objections to either of these courses are obvious. The government would have to provide for the demands of all districts at once and the capital needed would be enormous, probably over \$100,000,000 to cover the dry belt. If they guaranteed interest there would be scores of undesirable speculators applying for guarantees, and there would be no effective control over expenditure or management, and the risk of bad debts by homesteaders would be difficult to cover. If a company deals with a district, they would see that each application for service was a 'bona fide' business proposition, and not a demand as a political right, and they would want security for payment.

Canadian custom and policy has been hitherto against allowing the homesteader or pre-empter to give any kind of lien upon his land prior to the issue of his patent, but in the case of land requiring irrigation there seems to be fair ground for reconsideration of this point. It practically means shutting the door to settlement in many cases, unless the settler is allowed to make a contract for irrigation and give a lien upon his land as security. Could not both political parties approach this subject on a business basis and agree to regulations that would enable companies to deal with settlers on a sound basis and thus accelerate the settlement of the dry belt? What would it matter if a few homesteads or parts of them, passed from defaulting settlers into the hands of irrigation companies in the form of irrigation leases and subject to proper conditions as to subsequent re-settlement? The whole subject seems to hinge on the point of security.

As the law stands it appears that the Minister of the Interior could at once deal with the subject on Dominion lands without fresh legislation, and under the British Columbia Land Act, sections 41, 45 and 47, there are sufficiently wide powers reserved to the Lieutenant-Governor in Council to sell, lease, or make free grants of lands for irrigation, the encouragement of immigration or any purpose whatsoever under such regulations as may be deemed advisable.

Settlers are often impecunious people and start without sufficient capital but if they are helped by irrigation companies, they would generally be able to make a living on a smaller area than would be needed on dry land and it would be no great burden on them if they had to pay irrigation charges for the first few years by parting with some of their land, which would soon be disposed of to another settler and a greater population thereby secured.

It will be impossible to give supplies of water or power at the same rates in all districts, as the prices must depend upon the quantity demanded in each district, the sources of water supply, the cost of the local works, the elevation and situation of the lands served, &c., but schedules of rates could be settled for each district and terms reduced from time to time as the local demand grew.

Water users need some security as well as irrigation companies. A company that seeks to do business without incurring any liability in case of its failure to render the intended service will naturally be looked upon with suspicion and left alone. On the other hand it may be undesirable for a company to be made liable for all sorts of consequential damages in case of failure caused by some accident or unforeseen circumstances, or strikes. A happy medium may be provided by limiting liability to an agreed scale, in case losses are proved to have been incurred owing to some interruption of the service.

In conclusion the author would suggest that the constitution of the Western Canada Irrigation Association be widened by introducing the principle of individual membership open to any person interested upon payment of a small subscription. At present the great majority of persons most keenly interested in the work (the actual farmers) have no status at all in the association unless elected as delegates, whilst the municipalities have a large control of the management, although they are not elected as aldermen on account of their expert knowledge of rural affairs. Those who happen to possess that knowledge would naturally remain members.

The main object in the future should be educational and a general interchange of views and information, and all members should be entitled to attend meetings and to be supplied with printed reports of the proceedings. Some such change would give renewed and permanent vitality and utility to the association and increase its value as an aid to the general development of the country.

Mr. BURRELL.—The paper we have just heard and which has been very instructive and practical, bears out a resolution I drafted before that paper began, on the question of pumping. The resolution that I am moving now, if it is in order to do so is: 'That the government of British Columbia be respectfully requested to have a bulletin prepared by an acknowledged competent authority which shall deal in a practical and comprehensive way with the question of irrigation by means of pumping.' I think that this work lies within the jurisdiction of the government and is a practical way in which they can help out a large number of people.

Mr. LAWRENCE.—I have very great pleasure in seconding that resolution of Mr. Burrell's and I would say that we have a practical illustration on the Island of Guernsey where water is pumped for irrigation. I feel certain that if we had a deputation of Guernsey men over here, they would declare in a most decided manner that that is the way to irrigate any of these lands that are now out of reach of irrigation

by gravitation. It is a matter of regret I know on the part of us people in these districts that these thousands of acres are now lying idle.

Resolution carried unanimously.

The CHAIRMAN.—I have just been informed that in making an announcement a little while ago I made a very serious mistake. I should have announced that at this band concert to-night, the ladies connected with the library will serve ice cream free to all delegates at this convention. I am very sorry I made the mistake I did.

Mr. LAWRENCE.—May I ask permission to speak for a moment? I would make a remark in regard to the different papers that have been read. I have noticed in all these papers wherever an attempt has been made to deal with the subject of dry farming, the fundamental principles of dry farming seem to be unknown to the writers. I would ask permission to write a paper on dry farming as I have experienced it and seen it in the semi-arid areas of British Columbia.

I listened to what Mr. Martin Burrell said when he was telling us the amount of water required for certain trees and his practice does not justify his words. His practice is a great deal better than he said and the results are a great deal better than he said. When I went through Grand Forks valley last year seeing what there was to see, I was courteously treated by Mr. Martin Burrell and others in the neighbourhood. I had no idea there were so many fine orchards there, and Mr. Martin Burrell's stood a good first, and the remarkable thing was this that the seven year old orchard that had never had a drop of water for irrigation was bearing an exceptionally good crop and last year was a bad year for crops, and I say his words did not set that forth, and that his practice is a good deal better than his words.

Mr. BURRELL.—I rise to a point of order. The orchard to which he refers which I have never irrigated is only six years old. And while it had a very good growth and was in very good condition, what I said the other night was perfectly true and when that orchard arrives at the age of ten years I would not expect it to be in good condition without water.

Mr. LAWRENCE.—I would say that whether those trees were six or seven years old, they had a good crop for their age. While he says that when those trees have reached the age of nine or ten years they must have a good deal more water, there is Cooper Bros. who have trees thirteen years old that have never had water and are bearing excellent crops and therefore are a matter of interest to dry farmers. Where the fundamental principles are known and intelligently carried out it is possible that these large crops can be produced, and dry farming is no longer in an experimental stage. There is a object lesson in Mr. Burrell's and Cooper Bros.' orchards. People are taken to see the finest crops in the valley being produced for the last nine or eleven or thirteen years without water and where the rainfall is not more than 12 inches per annum. Is that not right Mr. Burrell?

Mr. BURRELL.—It depends entirely on the distribution.

Mr. LAWRENCE.—No, I am speaking about the annual precipitation. That is my excuse for saying that Mr. Martin Burrell's practice is better than his words, and Cooper Bros.' place is a remarkable object lesson which entirely refutes one-half the statements made by people who attempt to prejudice the minds of others against dry farming.



The CHAIRMAN.—I have no doubt that Mr. Lawrence's paper will be very acceptable if he will send it in.

Mr. MARTIN BURRELL.—I would like to propose a vote of thanks to the Association, and to the local committee, and also the gentlemen who so kindly provided the entertainment up the river.

Mr. JAMIESON.—I have very much pleasure in seconding that motion. I am sure that we are all particularly grateful for a few days on these two delightful streams that you have here. We have enjoyed ourselves very much, and we have been well looked after and entertained by the committee and by the good people of Kamloops. We have enjoyed exceedingly our stay here and feel that we have been well rewarded by the valuable information we have received from the discussions and the papers read. We enjoyed very much the trip up the North Thompson which was a revelation to me. I did not have any idea of the great possibilities of development in this region, as was evidenced by the trip. Although the trip was delightful we enjoyed very much the landing and refreshments up there so well provided and so well served and so thoroughly enjoyed, and I am sure that I am speaking on behalf of all the delegates as well as on my own behalf in very heartily seconding the motion that has just been made.

Mr. TREGILLIS.—We have truly enjoyed ourselves and I do not remember attending any convention where our entertainment has been carried out as successfully. The first day we came here it was very hot and dusty and the next morning when we arose, the dust was laid and we had everything that was enjoyable, and I am sure our trip to Kamloops has been very much enjoyed and we will long have pleasure in looking back on it.

The CHAIRMAN.—I do not know if it is necessary that I should put this motion to the meeting. (Great applause.)

Mr. HARCOURT.—I would like to move a vote of thanks to the ladies of the public library who have so kindly offered to serve the delegates with free ice cream at the band concert this evening.

Mr. BURRELL.—I have very great pleasure in seconding that motion.

Carried.

Mr. TREGILLIS.—I would move to adjourn.

Mr. HARCOURT.—I second the motion.

Carried.

The convention then adjourned.

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## IRRIGATION IN THE PROVINCES OF ALBERTA AND SASKATCHEWAN.

(Paper presented by E. F. Drake of the Forestry and Irrigation Branch, Department of the Interior.)

Irrigation has been practised to some extent in the southern portions of what are now the provinces of Alberta and Saskatchewan ever since these districts were first settled, but the irrigated tracts were of small extent and the works were crude, usually



Forms for making 46" reinforced concrete pipe, Umatilla Project, Oregon.

consisting merely of makeshift dams and headgates, and ditches sufficient for the irrigation of a few acres of garden or meadow in connection with cattle raising, which was the chief occupation of the earlier settlers.

There was at this time no law regulating the use of water for irrigation, but as settlement advanced the necessity for such a law became so apparent that in 1894 the 'Northwest Irrigation Act' was passed. This law was the result of some two years careful study of the irrigation legislation of other semi-arid countries and, while it

has been amended from time to time in such manner as experience has shown to be necessary, it stands to-day substantially as when first enacted.

The 'Irrigation Act' of to-day (Chapter 61 R.S.C.) is believed to embody such of the best principles of the irrigation laws of other countries as are applicable to conditions in Western Canada, and to be free from most of the defects of those laws. Its essential features are:—

I. That the water in all streams, lakes, springs, ponds or other surface sources of water supply is the property of the Dominion government.

II. That the right to use this water may be obtained by companies or individuals upon compliance with the provisions of the law.

III. That the uses for which water rights may be so acquired are:

(a) Domestic, which includes household and sanitary purposes and all purposes connected with the watering of stock and the operation of agricultural machinery by steam.

(b) Industrial, i.e., the operation of railways and factories by steam.

(c) Irrigation, and

(d) Other purposes than those above-mentioned.

IV. That the individual or company acquiring such a water right shall be given a clear and indisputable title to the right to the use of the water so long as he shall continue to apply it to beneficial use.

V. That such rights may be forfeited by abandonment, waste or non-use.

VI. That holders of water rights shall have the protection and assistance of permanent government officials in the exercise thereof and that all disputes and complaints in connection therewith shall be referred to and settled by such officials, whose decisions shall be final.

The procedure for the acquirement of water rights is simple, inexpensive and effective. Each applicant is required to file with the Commissioner of Irrigation a memorial and plans showing clearly the source of water supply, the point of diversion, the character of the proposed works, and the land to be irrigated. He is required to own or control the land to be irrigated, or to enter into and submit to the government agreements for the supply of water to lands not owned by him. When it has been satisfactorily established, by actual inspection on the ground, that the project is feasible, not only from an engineering standpoint, but as a commercial proposition, authority is given for the construction of the works and a date is fixed for their completion. If, for any reason, the works are not finished within the period granted for the purpose extensions of time may be granted, but cause must be shown by the applicant for failure to complete the works within the time originally granted.

Upon the completion of the works the law requires that they shall be inspected by a competent engineer in the employ of the government. If, after such inspection, the works are found to have been constructed in accordance with the plans filed, the Commissioner of Irrigation so certifies and a license is issued authorizing the applicant to divert a sufficient quantity of water, at the rate of one cubic foot per second for each 150 acres, to irrigate the irrigable land shown on his plan. The water then

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becomes appurtenant to such land and may not be transferred or used upon any other land without the written consent of the government. The license remains in effect for as long as the works are maintained in good condition and the water is used for the purpose for which it is granted, but provision is made for cancellation of the license for abandonment or non-use.

Penalties are provided in the Act for using water without authority, or for using quantities in excess of those granted by license. Provision is also made for the protection of the rights of riparian owners to such water as they may require for domestic purposes. Ample power is given to the Minister of the Interior to make such orders and regulations as may be necessary to carry out the provisions of the Act according to their true intent, and to meet any cases which may arise and for which no specific provision is made.

#### *Sales of Land for Irrigation.*

Within a defined tract in the drier portion of the irrigation district the government will sell land for reclamation by means of irrigation. This tract comprises the southern portion of the province of Alberta and the southwestern portion of Saskatchewan. The conditions of such sales are:

1. Before any such sale is authorized it shall be shown to the satisfaction of the minister that the land applied for is irrigable and the water supply sufficient, and that the applicant has applied for a water right and received authorization for the construction of the necessary works.

2. When not exceeding one quarter-section is sold, at least ten acres shall be irrigated, but a sale on such conditions will be made only in cases where the irrigation works are entirely independent of any other works, and where the water is not used upon any other lands.

Where more than one quarter-section is sold, or where land is irrigated on more than one quarter-section, at least 50 per cent of the area sold shall be irrigated.

3. All such sales shall be made at the rate of three dollars (\$3.00) per acre, payable in six equal annual instalments, the first of which shall be made within sixty days from the date on which the sale is authorized. Interest at 5 per cent per annum is charged from the date of sale.

4. It is required that each purchaser shall acquire, by purchase or otherwise, any land (other than Dominion land) upon which any of his works are to be constructed and that he shall transfer title to such land to the Crown. Upon the completion of the irrigation works and the issue of the water license a 'license of occupation' (a conditional patent) will be issued to the purchaser granting him the right to use such land for the operation of his works for so long as his water right remains in effect. This grant may be cancelled should the grantee fail to maintain the irrigation works in good condition. The area required for such right-of-way is fixed by the Minister of the Interior.

5. Should any purchaser of land under the irrigation system fail to use the irrigation works on such land for the purposes set forth in his plans and memorial within a period of two years from the completion of such works, the ownership of the works shall be forfeited to the Crown.

6. If the works are not completed within the time granted for the purpose, the agreement to sell the land may be cancelled and the amount paid on account thereof may be forfeited to the Crown.

7. In addition to the construction of the irrigation works, the purchaser is required to actually irrigate the land for at least one season before letters patent will be issued to him.

8. Applications to purchase land under these regulations must be made to the agent of Dominion lands for the district in which the lands are situated and should show that the land is required for irrigation. All applications for water rights must be made to the Commission of Irrigation, at Calgary, Alta., and must be accompanied by a description of the land applied for.

These regulations are framed with a view to the encouragement of irrigated farming, and they impose no onerous conditions upon settlers who in good faith construct and maintain the necessary works and irrigate the land; at the same time the regulations distinctly discourage applications to purchase land for purely speculative purposes.

The foregoing will suffice to show in a general way the conditions under which water rights may be acquired and land purchased for irrigation purposes.

#### *Development of Irrigated Farming.*

As a result of the enactment of the first irrigation law and of the interest awakened by the energetic prosecution of hydrographic surveys, there was a considerable development of irrigated farming for a few years, particularly in the district between Calgary and Lethbridge. Unusually abundant rainfall for several consecutive years fostered the belief that the climate was changing as a result of settlement and many people allowed their irrigation works to go to ruin in the belief that they would not again be required. Whether there is any truth in the theory that climate, particularly rainfall, is appreciably affected by settlement, the writer is not in a position to express any opinion upon, beyond saying that the case does not appear to have been proven as yet. Latterly some of the old ditches have been repaired and used, but in a good many cases they have not been used for several years and the licenses are now subject to cancellation. It is, however, not the policy of the government to cancel water license for non-use so long as there is any reasonable probability of the works being repaired and used. If, however, the water covered by such unused licenses is applied for by others cancellation proceedings will be promptly taken, unless the licensees undertake to repair their works at once and to apply the water to beneficial use.

Within the past three or four years there has been a considerable development of irrigated farming in the Cypress Hills country, south of the main line of the Canadian Pacific railway between Moosejaw and Lethbridge. There are many small streams in this district and the irrigated tracts are usually small areas in the valleys. No attempt has yet been made to construct larger works for the irrigation of the higher lands. Some cereals have been grown by irrigation, but water has generally been used only for hay and pasturage. The results have been good, particularly so where the works have been substantially constructed and the ditches well laid out. When there have been failures—and there have been some—the cause was usually defective engineering or faulty construction, or ignorance of the proper methods of using water.

Improperly designed or constructed dams have been washed out by the early spring floods, with the result that water could not be used when there was plenty to be had, and by the time the works were repaired there was little or no water to be had. In other cases where the dams held and there was plenty of water, the distributing ditches were improperly laid out, with the result that large areas were left unwatered. In still other cases too much water has been applied to land without good natural drainage and the land has become waterlogged and sour. Irrigated farming cannot be said, as yet, to be in a flourishing condition, but water users are learning by experience and methods are improving.

#### *Area Irrigated.*

Aside from the larger projects under construction by companies, there are now 390 separate irrigation schemes in Alberta and Saskatchewan. These are classified as follows:—

	Acres.
192 Licensed schemes, irrigating. . . . .	51,700
167 Authorized (uncompleted) schemes to irrigate. . . . .	64,000
31 Applications. . . . .	11,500
390	127,200

One large project for the irrigation of some 67,000 acres was recently cancelled for failure to begin construction within the time allowed.

In addition to these small schemes there are three larger projects now under construction by companies. These are deserving of especial mention.

#### *Alberta Railway and Irrigation Company.*

This company holds water rights on St. Mary, Milk and Belly rivers and has constructed a canal with a capacity of about 800 second-feet, taking water from St. Mary river near Cardston, Alberta. It has completed, or under construction, a system of canals and distributories aggregating some 250 miles. Much of the work is of a very substantial character, and it represents an expenditure of some \$1,250,000. At the present time only about 73,000 acres are actually irrigated from this system, but when fully developed it will provide for the irrigation of at least 350,000 acres. Excellent results have been obtained in the vicinity of Lethbridge and Raymond, and alfalfa and sugar beets have proved very profitable.

#### *Canadian Pacific Railway Company.*

This project has been so widely advertised that it is probably better known than any other irrigation scheme on the continent to-day. The tract to be irrigated comprises some 3,000,000 acres along the main line of the company's railway between Calgary and Medicine Hat, chiefly north of the line. The soil is productive and easily worked and much of it is well adapted to irrigated farming. Surveys so far made indicate that about one-third of the whole tract, or about 1,000,000 acres, can be irrigated. For administrative purposes the tract has been divided by north and south lines into three sections of about equal area. For the western and

central sections water is taken from Bow river, at Calgary. For the eastern section a dam is now under construction in the Bow near the 'Horseshoe Bend,' in the vicinity of Bassano. A fairly complete system of canals and reservoirs has been built in the western section and the system is now being rapidly extended in the central section. Work has only been begun in the eastern section, but this, in the writer's opinion, will ultimately be the best of the three sections, as it contains a greater proportion of irrigable land than the others and, owing to the topographical conditions, the distributing ditches can be constructed at less cost. Some excellent results have already been obtained in the western section, but comparatively little has yet been attempted by the settlers beyond laying out their farm ditches and preparing the land. Within a year there should be some good results in this tract.

*Southern Alberta Land Company.*

This company also uses water from Bow river. Its main canal taps the river about thirty-five miles southeast of Calgary and runs in a southeasterly direction for some fifty miles, where it empties into a large reservoir known as Lake McGregor. This reservoir covers some 18,000 acres and is capable of holding about 360,000 acre-feet of water. The earthen dam at the north end of the reservoir is of the following dimensions:—

	Feet.
Length. . . . .	3,600
Width at base. . . . .	173
Width at high water mark. . . . .	53
Width on top. . . . .	23
Height. . . . .	48
Height of high water line. . . . .	38

Slope 1½ to 1 with an 8-inch reinforced concrete face on the reservoir side. The dam at the southern end is 2,100 feet long and 46 feet high, otherwise of the same dimensions.

From the southern end of the reservoir a canal runs in an easterly direction to the tract to be irrigated. The Bow river dam is a substantial, concrete structure, and the works generally are of the most substantial character. Some of the work between the intake and the reservoir is very heavy, there being one long cut 64 feet deep.

It is expected that the work will be sufficiently advanced to permit of water being turned into the reservoir sometime next summer (1911), but probably no actual irrigating will be attempted before 1912. The company has purchased from the government a tract of some 380,000 acres and has acquired other land in the district west of Medicine Hat, so that it will own something over 400,000 acres eventually, but probably only from 30 to 40 per cent of this can actually be irrigated.

Although, as has already been stated, irrigation has been practised in Alberta and Saskatchewan for a good many years, it is as yet in its infancy. Greater attention is now being given to it and more approved methods are being followed, and there is every reason to believe that within a few years many large tracts, now barren and unproductive, will be transformed into well cultivated and prosperous farming communities.

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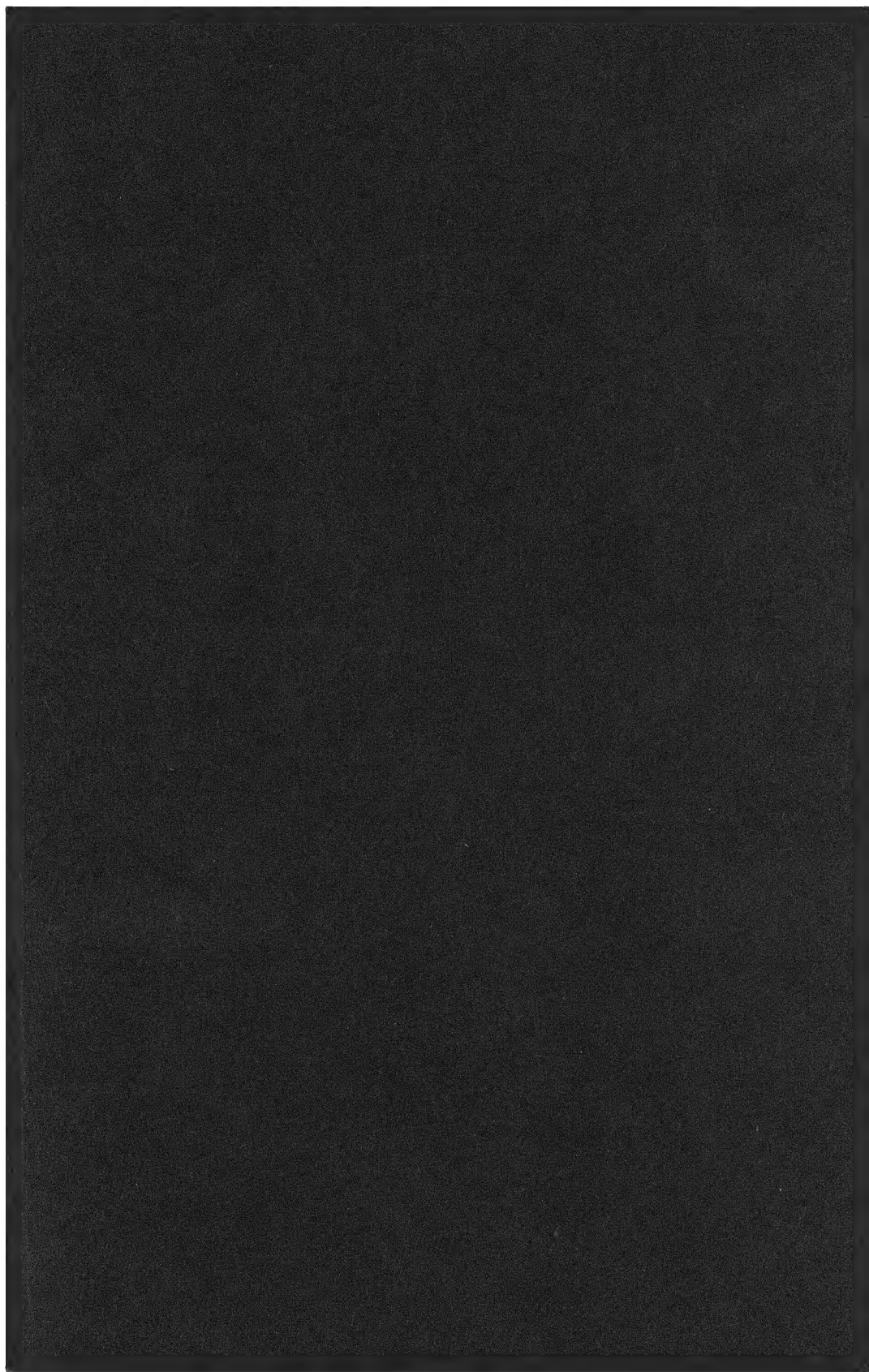


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